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LETTERS

Contact Canadian Computer Wholesaler welcome your opinions on current issues in the market. Please your feedback on our publication.

NEWS

We welcome your ideas regarding news and feature topics for Canadian Computer Wholesaler. Feel free to contact the editors directly with your suggestions.

TEST LABS

We'd like to hear your feedback and suggestions on our Test Lab reviewed section.

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If you've been in the computer industry for a few years, take a moment to consider how very quickly the stuff you do for a living has become absolutely mainstream.

Look no further than Hollywood's latest creation, "You've Got Mail." The last time Meg Ryan and Tom Hanks got together on the big screen ("Sleepless in Seattle"), they darkly demonstrated the dubious effectiveness of the postal service. Now just a couple of years later, they're busy sending e-mail as well as text-messaging (over AOL, no less) on high-speed modems.

If we're lucky, perhaps movie-goers will now rush en masse to get on-line in the search of understanding and romance. But know this: As members of the computer industry, you're not just helping superstars find love; you're making a real contribution to the Canadian economy.

That's according to the recent "Canadian Channel Report Study" by International Data Corp. (Canada) Ltd. It said Canadian channel revenues accounted for \$17.9 billion in 1995, up from \$16.1 billion in 1993. (Of that, a notable \$2.7 billion was attributed directly to services in '95.)

The study used about 130,000 Canadians working in the channel (including distributors, resellers, consultants and integrators). That's three channel jobs for each job with a product vendor. Moreover, as knowledge workers, you earn 29 per cent more than the average Canadian worker, the study reported. (Although that's still somewhat less than the average professional sports player.)

In 1992, the channel represented 1.17 per cent of the Canadian gross domestic product, a bigger contribution than many other significant industries, including accounting and legal, printing and publishing, or logging and forestry.

Michael O'Neil, country manager for IDC Canada, said, "We're no longer hearers of wood and drawers of water. This study is just a salutary of the total benefit businesses buy computers for solving problems. Technology represents a solution to business problems,



WAY TO GO, CHANNEL?

and that's felt across the economy."

Of interest, the percentage of technical support staff is growing at channel companies, said IDC, from 26 per cent in 1992, to 28 per cent in 1994, to a forecast 31 per cent in 1995. Incidentally, that's a trend we've been working to address here at Canadian Computer Wholesaler, with an increased emphasis on technical content in the magazine. This week, see the final installment of a four-part review of motherboards by Graeme Bennett ("Motherboard Memo," page 32). And our Lab Test (page 30), under the direction of Sean Currah, examines the growing market segment of handheld computers.

IDC's "Canadian Channel Report Study" was commissioned by Microsoft Canada Co. and Hewlett-Packard Canada Ltd., and is available on-line at <http://www.idc.ca/reports.htm>.

Bernie Moensterman, senior vice-president and general manager, for HP's commercial and channels organization, said only 27 per cent of Canadians have university degrees, compared to 25 per cent of Americans. "This is where we can add value as a vendor," he said, citing the importance of training and certification programs.

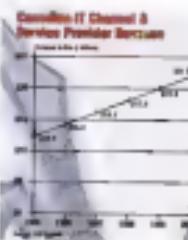
Andy Welsh, principal for Toronto-based systems integrator, Duschkin Systems Group, said each of his company's employees is in training about 20 person-days per year. Almost 90 per cent of staff are "technical," he said, and 90 per cent of the company's revenues (forecast at \$1.9 million for the year to end in April '96), are attributable to services. The number of employees at Duschkin grew from 120 to 240 in 1995.

HP's Moensterman also referred to Canada as the third most connected nation in the world, following Iceland and Norway, but ahead of the U.S. (he's something about Arctic climate?)

But then again, as someone dourly pointed out in "You've Got Mail," "The Internet is just another way to be rejected by women."

Happy New Year.

Grace Cuthbert
Editor



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2000 (Vol. 11, No. 1)

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Check Your Prices!

I would like to know what your staff is actually doing instead of reading "street press."

Business Depot stores have been selling the Xerox P12 for \$895 for several months now. Is this not a "street price?"

You should give serious consideration to changing the "Overall" award to the P12 next ICDM contest. (See Test, page 38)

I design and build custom PCs and networks for a living and am very much up-to-date on current technology and prices.

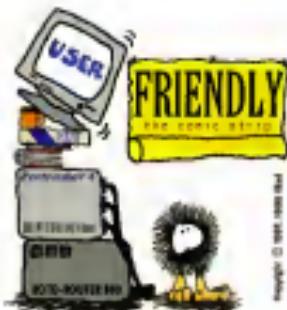
Readers like myself rely on your accurate reporting to establish base bags for our clients. Please try to remain credible to your money-keepers. Some of your unsung/forgetting readers may well have already purchased a Xerox P12 for \$1,150 on the strength of your Lab Test.

Kerry Cannon
Marketed, Ont.
kcan@pcplus.com

Editor's Note:

Putting in our Lab Test is based on information provided by the vendor; although we do offer our local readers to submit the accuracy of these numbers.

And remember in this industry, prices can drop very quickly.

**Pedal Up with HP Authorization**

In more than 11 years in business we have actively promoted Hewlett-Packard products where they are appropriate for our customers. We have repeatedly been required to remove HP Authorizations to sell HP products because they are continually "revamping" their distribution strategies.

Following the latest reorganization of reseller authorizations by HP, we are no longer authorized to resell any of their "business" products and are limited to "personal" products only. Personal products are inappropriate for use in a business environment.

The majority of our revenue is generated through service and sales.

We can't sell products, it is because the client trusts us to provide what is best for their needs, not best for our vendor's volume requirements.

In the past, we have reported HP distribution-channel decisions because they were still the best game in town for many products. In order to give our clients best value we had continued to review third-party products.

We are not appealing this latest HP authorization decision... HP now has legitimate competition. Computer stores offer products that are as good or as superior to HP offerings.

Marc J. Dauphin
Operations manager
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Editor's Note:

According to Hewlett-Packard representatives, reseller authorization includes a volume component. An official statement presented by the company says: "Resale! Packaged software license or license/distribution contract value and a commitment by the reseller to add value to their customers based on HP technology. We are looking for those resellers who can deliver an increased opportunity for both HP and our partners. HP is a process for authorizing partners as well as our sales channel." ■

Letters to the Editor

We welcome your letters on industry issues and concerns, as well as your comments on our magazine.

We reserve the right to edit your contributions for length and clarity.

Please write to The Editor, via e-mail at ccl@tpc.ca or fax, (604) 529-2860.



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Today, regardless of the PC brand you choose, the most important component is not the computer. It's the monitor.

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INDUSTRY FLASH

New Home for Supercom

Kicking off 10 years in business, Supercom Direct has officially opened its new 52,000 square-foot headquarters in Markham, Ont.

The facility hosts the distributor's sales, administration, distribution and manufacturing operations, including a chemical assembly program for IBM Canada Ltd.

With reported Canadian sales of more than \$600 million, the 500-plus workers with 2,000 resellers across the country, and also has offices in Vancouver and Montreal.

In other news, Supercom recently signed a distribution agreement with Advanced Micro Devices Inc. (AMD), and will now carry the AMD K6 line of microprocessors.



Outsourcing Web Servers

Netcom Canada says its New Server Collection Service is aimed at businesses that want high bandwidth Internet connectivity, but don't want to manage the servers.

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Holiday Game Buyers Were in the Mood!

According to expectations, game were good to sellers of entertainment software in 1998, especially in the hottest game console market, according to an annual Deloitte and Touche National Retail Federation Consumer and Retailer report.

According to the "Mood Survey Retail Holiday Outlook," holiday sales of video games were expected to increase five to six per cent over last year, the best growth since 1994. That's despite the deep presence of the Sega-Saturn video game system — a victim of the market's cut-throat competition. The two remaining video game platforms, the CD-based Sony PlayStation and the cartridge

based Nintendo N64, have surged in sales of hardware and software, so North American sales levels should be 26 per cent higher in 1998 than the year before.

The numbers associated with video game sales of both units and dollars, are staggering. The June 2nd game Goldmine for N64 has sold over 500,000 units in Canada alone.

Sony Canada's Bush Freedhoff claims PlayStation games 70 per cent of the video games software market in Canada, with such titles as Crash Bandicoot, Wipeout, Texas Hold 'Em, Castlevania, NFL GameDay '98 and Spyro the Dragon.

CCCA Raises Big Bucks for Charity

What a strike! The Greater Ottawa Computer Association says it raised \$30,000 for charity at its recent Annual Bowling Tournament and Gala Dinner in Toronto. Charities to benefit included the Salvation Army of Ottawa, the Greater Toronto Region, the Canadian Red Cross (one of the victims of the Okanagan flood), and the CCCA Charitable Foundation.



Pictured here are CCCA president Frank Lai, the West Coast Rainforest Service, Angus MacPhee, and board chair John See.

Mac Hits Future Shop

Apple is putting Macs into the Future Shop chain, which has 111 locations across Canada.

According to Wendy Heyes, managing director of Apple Canada Inc., Future Shop focuses on the consumer market and Macs appeal to first time computer buyers makes for a great retail partnership.

The deal won't take effect Nov. 30, allowing Apple to get its retail store market share out in front of the buying public in time for the peak Christmas shopping season.

New models of Mac may be expected in early 1999, as Apple attempts to keep up the excitement and the sales of its much-loved product line. DR



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Source: MVA 1998 Report Card



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AOL

Gobbles Netscape, Sun Shines Approvingly

Will Microsoft "make nice" to AOL, which has suddenly become a powerful competitor rather than just a major customer, or will Microsoft play hardball?



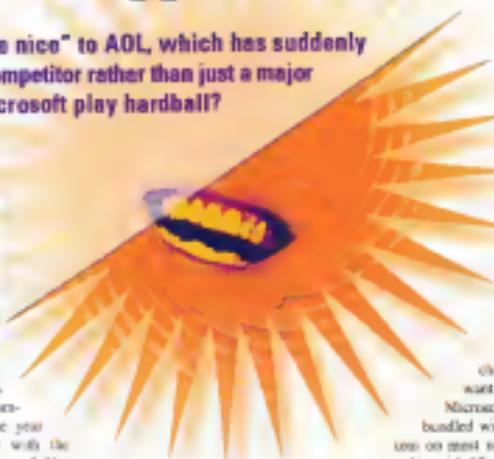
By
Jeff Evans

The rules of computing's Great Game — who will dominate the Internet after the year 2000 — changed considerably with the announcement of the acquisition of Netscape Communications Corp. by America Online Inc., in an all stock deal worth US\$3.4 billion.

In one stunning move, Netscape, the company that boosted it would know, Microsoft's dominance in the computer software market, and popularized and commercialized the World Wide Web, created to no independent entity.

Netscape's CEO Jim Barksdale defended the friendly take-over as the right thing to do in the current business climate, after having previously rebuffed a similar offer of a merger. He claimed there was a legal fit between AOL, the world's largest on-line service (with more than 14 million subscribers), and Netscape, the creator of the first widely popular Web browser.

A few years ago, Netscape bravely provoked Microsoft by claiming that the new model of networked computing, involving powerful Web servers connected to huge numbers of computing devices based on Web browsers, would make Microsoft's Windows operating systems and desktop applications obsolete. Microsoft's response was to



massively re-orient the company to become Web centred, and in tactics allegedly included actions which are now the subject of the U.S. Department of Justice's anti-trust investigation. Netscape was forced to give its own browser away for free to match Microsoft's tactics. The company was in the process of re-orienting itself to a supplier of commercial networking software and services when it decided to accept AOL's takeover offer.

Sun Microsystems' CEO Scott McNealy was on hand at the Netscape/AOL teleconference to lend his stamp of approval to the AOL/Netscape deal. One of the chief

fan of Microsoft, Sun is expected to show interest in other licensing products from or acquire acquiring Netscape's Web server software division. Ironically, AOL is one of Microsoft's largest software licensees, as it offers the Microsoft Internet Explorer browser to all its subscribers. If AOL were to switch its choice of browser to Netscape Navigator, Bill Gates would see his company's share of the browser market shrink by about a fifth (from the current 50 per cent to about 40 per cent).

However, AOL's CEO and chairman, Steve Case, claimed to want to maintain the connection to Microsoft. AOL's signed software is bundled with the Windows operating system on most new desktop PCs. A continuing partnership with Microsoft is important for AOL to retain access to the desktop, Case said.

Many questions remain unanswered: will this merger help or hurt Case's defense against anti-trust charges? Microsoft claims it's beneficial, but government representatives say this has no bearing on alleged past Microsoft practices.

Will Sun and AOL move into a closer partnership, and will Sun acquire some part of Netscape to bolster its currently tenuous presence on the PC desktop?

And, perhaps most interestingly, will Microsoft decide to "make nice" to AOL, which has suddenly become a powerful competitor rather than just a major customer, or will Microsoft play hardball? Bill Gates has shown an uncanny ability to turn crises into opportunities. Watch and see if he can turn this sudden sea-change in the computing landscape into a pathway for Microsoft's continued growth [B]

Jeff Evans is Associate Editor of Canadian Computer Wholesaler. He can be reached at jeff_jevans@ictp.ca

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Emerging Technologies will Enhance Future Offerings



David Tsoukis

While it's always exciting to see the new products at the Comdex/Pittil trade show, the hints about what's to come are even more intriguing.

As well as showcasing products that are ready or nearly ready to march onto dealer shelves,

some vendors were showing works in progress — technologies not quite ready for prime time but which open interesting possibilities for the future.

During Bill Gates' keynote address, Microsoft researcher Bill Hill introduced the audience to ClearType, a technology that promises to triple the resolution of TFT screens. Hill explained that typography is a centuries-old craft that seeks to enhance the readability of print on a page. Typography on computer displays has not gone through a similar refinement and is still quite primitive by comparison. This rough-hewn nature of type on a computer screen means that people find it generally unpleasant to read large amounts of text on-screen.

While Hill did not state a timetable for the commercialization of ClearType, the announcement already creates some interesting possibilities for product development and evolution. Since it works with TFT screens, ClearType may accelerate the adoption of flat-panel displays while enhancing the density of CMOS. And if the resolution and clarity of on-screen type can begin to approach type printed on paper, a sizable barrier to the development of products like electronic books will be removed.

Quite a different direction on display research was being showcased at the Panasonic booth: a prototype of a reflective TFT screen. The 10.4-inch screen was mounted in a normal-looking notebook computer and offered 800 by 600 pixel resolution.

Normally, TFT screens are back-lit, making them thin and bright but also power hungry. Panasonic says its reflective TFT screen consumes just one watt, while still offering the high contrast and clarity characteristic of TFT screens. I can envision this technology being incorporated into the next generation of hand-held computer lineage; for example, 3Com's Palm product with a color screen. Given the modest appetite of the reflective TFT display, the Palm folks might even be able to pull a color unit out of the box while still offering decent battery life from a set of triple-A batteries.

A reflective TFT might also help eliminate one of the cruel wusses of the color screens now found on some handheld computers. Handheld computers are supposed to offer convenient access to your data whenever you happen to be in reality, that's not as long as that doesn't include the bright outdoors.

I've been generally enthusiastic about color CE devices, and still consider the color screen to be one of the best features of the Sharp Mobilia I carry around with me these days. But if I'm on the street, I can forget about looking up the address of where my next appointment is — the screen is completely washed out.

A reflective screen would throw in brighter light. If developers could incorporate an on-demand backlighting system to improve the reflective screen's readability under low light, users could have the best of both worlds.

It's not just screen technology of portable devices that may see improvement. The technology behind the generally under-used infrared port is also undergoing change. An advanced infrared protocol developed by IBM and Hewlett-Packard was demonstrated at the Infrared Data Association's Position in Comdex. IBM calls it "a revolution, not an evolution of the current Fast IR standards."

Fast, or Advanced Infrared as it is being called, improves infrared communica-

tion in several ways. First, AII supports multi-point connections. For example, three AII-equipped notebooks could form an ad hoc wireless network.

The communications range has also been increased, from about one metre to as much as three metres under ideal conditions. Our three hypothetical notebooks wouldn't have to be huddled on a single desk; they could communicate from opposite ends of a boardroom table.

The Advanced IR specification also doubles the angle of transmission/reception from the current angle of about 30 degrees. Users will have more flexibility in where they place their devices in relation to other devices they want to communicate with.

Fast IR supports data transmission of up to 4Mbps. IBM says Advanced IR will quadruple that — to 16 Mbps. The transmission will also be more dependable, and less prone to transmission failure if, for example an IR port is inadvertently obscured.

An IBM spokesperson predicted that products supporting this standard would show up in the market by mid-1999. Currently, the specification is going through the IRDA's review process. ■

David Tsoukis is a regular CCW columnist and a Editor of *The Computer Paper*. He is based in Toronto and can be reached at dtsouk@tpsys.com.



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What will be Hot?!

by Antonietta Pollicino

"Customers must understand that the mission of Y2K contingency management is managing the impacts of planned and unplanned failures, not attempting total prevention; it's too late for that."

— David Land

If we could throw all the current and pending technologies and trends into a big pot, which would rise to the top as hot opportunities for 1999?

The industry stakeholders have some thoughts about next year's key issues. Here's what they came up with:

Year 2000

If 1998 was the year a long-obscure software bug began to surface, causing businesses to concern, 1999 will be the mission of truth.

"My gut feeling is that it's going usefully late for anyone to be trying to resolve the year 2000 issue," said Joshua Greenbaum, principal with Enterprise Applications Consulting in Berkeley, Calif.

There's no doubt about it: organizations that have just begun to address the Year 2000 problem are behind the eight ball. "In 1998, if you're not well on your way to solving the problem, you're in serious trouble. Companies that really hasn't figured it out yet are in my mind going to suffer from the effects of natural selection," he said, predicting businesses that waited too long to start repair will wind up being sold, closed or merged with other companies.

David Land, president of management consultancy Information Strategies International in Atlanta, says with less than 12 months to go until the turn of the century, companies that aren't well into the testing phase no longer have the benefit of the lengthy assessment and usage process that those who started over one year ago have had.

While he doesn't advise giving up, those companies need to come to grips with reality, he says. "Last summer I heard the fact that there's only enough time to modify the most critical systems — and that system failures are inevitable." Land said it's important that all companies deploy a contingency management element in Y2K programs — one that businesses can create with the help of system integrators.

In a nutshell, Y2K business contingency management identifies a comprehensive list of threats, performs impact and ranking analysis, and creates planning and

mitigation activities. "Customers must understand that the mission of Y2K contingency management is managing the impacts of planned and unplanned failures, not attempting total prevention; it's too late for that," Land said. "The best available course of action is to map out what will be to help customers plan for and allow the failure of some systems."

Nonetheless, Y2K will continue to take a big bite out of 1999 IT budgets. According to a Gartner Group Inc. study, Year 2000 spending will gobble up 44 percent of corporate information technology budgets next year.

Small companies — those with fewer than 3,000 employees — will spend half of their Year 2000 budget on outside services, while large companies — those with more than 30,000 employees — will do most of the work themselves, said the Stamford, Conn., consulting group.

For many companies, Y2K will continue to mean deferring the rollout and deployment of new applications along with a host of many new Internet-based Web projects until the end of 1999 or beyond, Land said. "It probably means deferring customer upgrades to PC hardware and software and knowledge workers will have to forgo those new Pentium PCs or some application until the latter half of the year."

That may not be good news for vendors like Microsoft Corp., which is targeting 1999 as a key year for Microsoft's push in the enterprise. That is when Windows 2000, Office 2000, and Component Object Model (COM+) are expected to ship. As well, Advanced Micro Devices Inc. (AMD)'s forthcoming K7 processor is set to go head-to-head with Intel Corp.'s Klamath processor in the performance desktop PC market when the two chips are released early this year.

Greenbaum, however, doesn't think year 2000 will slow the replacement of proprietary legacy systems with Enterprise Resource Planning (ERP) systems from vendors like SAP, PeopleSoft and Baan. One way to deal with 2000 is to throw out legacy systems and implement an ERP system which is by definition Y2K-compliant, he said.

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What the experts do agree on: When the Big Day arrives, the only surviving organizations will be those that have adopted a full-scale contingency plan.

ERP Growth

As the ERP market looks to expand in 1999 past year 2000 quick-fix customers and ERP's traditional Fortune 1000 buyers, fixed-price implementations are going to get increasing play in the market-place.

According to Greenbaum, the fixed price approach will fit small- and medium-size customers accurately budget for the relatively expensive ERP transition, while the guaranteed implementation schedule will assist in proper scheduling of limited resources.

"There is a major shift in emphasis towards the mid-market away from the global 1000 companies, which has been going on in the last year but will hit its stride in 1999. And with that mid-market emphasis, one of the changes is the service delivery model."

He suggests systems integrators scrutinize their internal operations to decide whether they're capable of handling such implementations effectively. "If your growth plan includes serving smaller customers, then it's time to look into fixed-price contracts."

According to Greenbaum, the other change, as a result of focusing on the mid-market, is that companies interested in purchasing an ERP package will have a new option to consider: lease the "insurance-bundled" software instead of buying it and have it maintained by a third party.

While application outsourcing is not a new idea, it is an emerging business model in the ERP market and one that is gaining more attention by all top players, all of which are either beefing up their outsourcing options or are in the process of adding new programs in the next year. In terms of market size, the best guess analysis offers now is that it will likely represent just a single-digit percentage of the ERP market within the next five years, Greenbaum said. "The scenario is offer applications outsourcing services in response to companies demanding faster implementation times and lower ongoing ERP software maintenance costs," he said. Another market driver is the shortage of IT professional service skills.

Application Service Provider Model

Enterprise resource planning outsourcing is a part of a larger whole new distribution channel that will become more prominent in 1999 and which International Data Corp. dub the application service provider (ASP) model.

According to a report published last June by the Framingham, Mass.-based consultancy, "Buyer interest was modest but notable—with the highest interest in applications outsourcing pertaining to payroll, financial commerce, and supply-chain optimization."

Over time, a successful ASP will help drive a paradigm shift in the market and move the focus of competition beyond software features and operational efficiency to the total business solution, according to IDC. "Ultimately, ASPs have the potential to change the structure of the packaged application industry as we know it today," the report states.

IDC predicts that once telecommunications companies and Internet service providers (ISPs) integrated in adding traffic to their networks start evangelizing, the emerging ASP channel demand will go up.

Filling in the IT gaps

There will be a healthy demand for IT services sourced from external service providers during the next 10 years, according to market research firm The Farber Group. This includes demand for IT outsourcing, business process outsourcing, systems integration and consulting.

According to the Boston-based research company, a combination of business and technology changes, internal IT shortfalls, Year 2000 compliance initiatives, and the need for user education in new technologies and implementation methods will fuel 10 per cent or more annual growth in user budgets spent on systems integration companies during the next three years.

Systems integration companies generated almost US\$100 billion in 1997 revenues, including their 2000 projects, according to the Farber Group. The company expects the systems integration industry to grow at a compound annual growth rate of almost 10 per cent through 2000.

Electronic Software Distribution

The emergence of application service providers is but one of the ways in which the Internet will continue to shake up the software market in 1999, according to Steve McHale, research director for software channels and alliances for Toronto-based International Data Corp. (Canada) Ltd.

According to IDC, the worldwide market for electronic software distribution (ESD) is estimated at US\$300 million for 1997 and is expected to reach US\$3.9 billion in 2001. IDC projects that electronic license distribution will account for half of the total software license acquisition and distribution market by 2002 and achieve near 100 per cent market penetration by 2006, compared with an estimated five to 10 per cent for 1999.

McHale said as vendors and distributors work on ways to distribute licenses on-line, resellers need to be aware of the ways in which this market is developing and the role they can effectively play. ESD presents both challenges and opportunities for the channel. "For dealers who are accustomed to selling software based on margins, they will find numerous points of pressure with which they will be competing. The margins on these things are slim and what end users can expect for being able to buy over the Internet is small. Vendors don't offer a lot and they don't live in because the convenience factor is there," McHale said.

For resellers, ESD and the Internet represents an opportunity, he said. "There is a whole value model built into the Internet in the same way there is with any other business-to-business transaction, and it is going to be necessary for resellers to be able to maximize their value whatever they carry software electronically or not."

McHale also suggests the channel look at electronic license distribution as a way to cut and manage transaction costs. He notes that in 1999, there will also be pressure on vendors to provide, and resellers to support, more flexible end-user licensing options.

E-Commerce

In 1998, business claimed the Internet. Forget about chat rooms, virtual communities, long-distance learning and electronic pen-pals. That year, it became clear that the business of the Internet is business.

In 1999, e-commerce, e-marketing and supply-chain management will set atop the Internet agenda, said Wieland Mongayrac, principal web strategy-based consultancy CYBERManagement Inc.

According to the Organization for Economic Cooperation and Development, global e-commerce revenues will reach US\$3 billion by 2003. And the business-to-business e-commerce market will account for 80 per cent of overall e-commerce growth in the next five years.

On the technology side, expect to see further developments in the use of software agents — intelligent agents — to aid in electronic commerce, Mongayrac said. "What is coming right now from the e-commerce stage are powerful software agents that will allow users to do very comprehensive comparison shopping across multiple Web sites and businesses."

Mongayrac, who is also the author of "Opening Digital Markets," and while some Web sites now offer very rudimentary agents, "we'll see



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A World of Information in the Palm of Your Hand

Ultra-portable computing devices abound, so what's your best bet?

By Alan Crampton

For a small and portable device, obviously the interface is important. If it's too difficult to interact with, no one will want to use it, no matter how useful it might otherwise be.

Physically, most devices have opted for a touch-sensitive display and a stylus, keyboard input, or both. The use of the stylus seems a bit old school at first, but it's a nice touch with this new generation of computing devices; the ability to use the stylus directly on the display lends the kind of intimacy once formerly got with pen and paper.

For more important, though, is the electronic interface. Although some handheld users use their own proprietary operating system, Microsoft's Windows CE operating system seems to be the most widely-adapted OS for handheld devices. It makes sense for a majority of users, who are quite familiar with Windows 95 and Windows 98 on the desktop. CE is so similar that the new handheld owner only needs to learn a few new things, and they're ready to go. Plus, the integration between Windows CE and a Windows 95/98 desktop machine is easier to be seamless, with a handheld device acting more as a satellite of the desktop machine rather than as a machine in its own right. From the desktop, users can browse through the contents of the handheld like the handheld was just another drive on the desktop machine.

With so many manufacturers coming on-board with Windows CE, it seems a bit odd then that the most popular of the handheld devices by far is the Palm (Pilot) computing platform. This is despite the fact that it uses a proprietary OS, and has stylus-only input.

What does this mean? In the end, your customers may be less concerned with a color screen or a seamless mesh with the Windows desktop, even when pricing is similar. When someone walks through your front door interested in a handheld computer, your responsibility is to help that customer determine what they want to do with that machine, and which device is the best match.

This month, we requested a variety of handheld devices from manufacturers. Testing was done through general use of the machines in the field, evaluating usability and ergonomics. We also connected the machines up to a Windows 98 desktop system (using their appropriate cables or cradles).

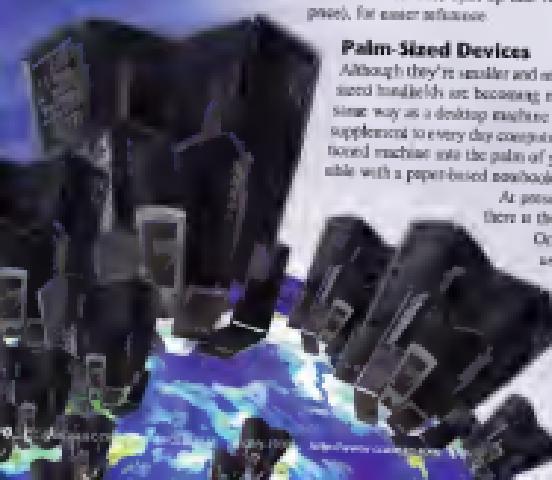
The devices were split up into two sub-groups, determined by size (and consequently also by price), for easier reference:

Palm-Sized Devices

Although they're smaller and more limited in functionality than their larger siblings, the palm-sized handhelds are becoming more powerful all the time. They're not designed for use in the same way as a desktop machine or even a notebook. Rather, the palm-sized units are more of a supplement to everyday computing. They offer a way to get information from a larger full-featured machine into the palm of your hand, to manipulate that data in a way that's just not possible with a paper-based notebook.

At present, devices of this size are monochrome LCD only, although there is the promise of color just around the corner.

One thing worth mentioning — with machines of this size, the user may have difficulty connecting them up to a desktop machine because of a memory issue. Because the units typically have only a small amount of RAM onboard, if too many applications are open, the user may be required to toggle around the back of the machine and hit the reset switch in order for a connection to be made to the desktop. This problem affected a couple of the CE-based palm-sized devices we tested this month.



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3Com Palm III

Street Price: \$499

IBM WorkPad

Overall Palm Device

Suggested Retail Price: \$249

The portable world was turned on its ear a few years ago with the introduction of the Palm Pilot. The Pilot was an odd little device that consisted of a display and a stylus. Users would remove the stylus from the device, and enter data into the Pilot via tiny input area using a method known as Graffiti (which we find like a cross between printing and hand-drawn). People would never dream of their notebooks for something like this, right?

Wrong. Since its introduction, the Palm Pilot has become one of the sensations of the computer age, commanding every to pick up the stylus and learn a new method of writing. The strength of the Pilots has always been its simplicity. Other devices forced the user to learn an entirely new operating system (or learn the differences between your desktop system and your handheld system). Instead, the Pilot had a set of applications on the device, and the user could quickly change from one to the other.

The Palm III is the latest incarnation of the Palm Pilot, adding color memory and infrared capabilities (which are available for the older Pilot via an upgrade module). The case design has also changed, with a sturdier plastic, smaller carrying and a plastic flip cover to protect the screen while not in use.

The Palm III and the WorkPad have more than a passing resemblance, because they are essentially the same device with different colored cases. 3Com and IBM signed a licensing deal allowing IBM to manufacture the Palm III for the enterprise market. Both devices share the same size of 3.5" LCD screen to interface with a PC, and both come with the same operating system and optional software package. References to "Palm II" is this review cover both devices.

Pros:

The tiny size makes these units incredibly portable. The user can tuck one of them into a shirt pocket without too much discomfort.

The plastic flip-cover is nice innovation, protecting the screen without the need of a separate protective case. It is removable, however, if users feel it's annoying (or ugly). The machine uses two AAA batteries and manages to squeeze in a lot of life out of those batteries. Bigger machines often have a lifetime of mere hours before they need recharging. We were able to run the Palm-style devices for weeks of regular use, and still had a good battery charge left at the end.

The device is able to suspend one task and change to a new one almost instantly. When the user switches between tasks and then back, the first task is in the same state as when it was suspended. In other words, no relaunching documents and finding your place.

Installations of the desktop software were simple and worked immediately on both Windows 98 and Windows ME. The desktop software makes it easy to enter and retrieve Palm III data.

Synching up the Palm III and the desktop is



as easy as dropping the Palm III into its cradle and pressing the "SyncNow" button on the cradle.

The four most common applications have physical buttons on the bottom of the Palm III. If the machine is off, these buttons will also turn it on. This makes getting to the Memo Pad or the To Do list incredibly easy from power-off.

Infrared beaming is available between Palm III units for transferring data. One of the most interesting features is the "business card" feature, which will transfer the default card just by holding down the Address List button.

Users who don't like the Graffiti method of entering data can bring up a miniature keyboard on the LCD screen, and tap in data that very.

No external power source is needed for the cradle.

There are a ton of applications specifically designed for the Palm Computing platform, both utilities and ones that can be purchased.

Cons:

Although some users can become proficient with the Graffiti input method, others may find it frustrating and difficult. During testing, even though we were able to get reasonably good at Graffiti input, certain letters were still quite difficult to enter properly ("v" was the worst). Punctuation was the most difficult to remember.

While Windows CE devices have better integration with the desktop and common documents, the Palm II is very basic. Text documents have a limited length and no formatting. (The hidden benefit of that is that the use of bold text allows much more of it to be stored in the Palm III than if it had formatting.)

Windows users who are accustomed to the "Start" being at the top of the screen may be thrown off by the placement of the menu control near the bottom of the screen area (under the control to switch applications).

Despite its proprietary operating system, it's easy to see why the Palm Computing platform has become as popular over the last few years as it is.

Incredibly simple. Other handhelds might attempt to do everything a desktop machine does, but the Palm III foregoes all of that in favor of compactness and basic but solid functionality. The machine may not be appropriate for working with long documents, (or its great for poking out short memos, keeping track of appointments, calculations, and writing e-mail. With some additional software, it also becomes a powerful tool for database work (you can run it up to spreadsheet-making enterprises, for example) among other uses. And though it doesn't mesh as well with Windows as the engineer said, CE devices, the Palm III blows them away in terms of accepting stylus input. True, learning the Graffiti method of input takes a bit of effort, but proficient users are able to enter just as many rapidly with Graffiti, thus with the hand-and-tap method the only real requirement is time.

Other Options In Handheld Computing
By Gary Wimberly

Handheld computers are an evolving breed. Within the past three years they have gone from being under-powered monoculture machines running a bewildering variety of less popular operating systems to amazingly powerful gadgets that can look, feel and run like Microsoft Windows and reasonably feature-rich displays, both in resolution, Web browsing and e-mail software.

Over the past year we have spent a lot of time with two machines that demonstrate a real potential in this arena—the class of handheld systems—the Sharp Mobilon HC-4500 and the Palm Series 5.

Sharp Mobilon HC-4500

This portable entertainment machine first appeared in the autumn of November of 1997 as the Comdex/Fall computer trade show. It was notable for its use of a solar array, a rechargeable battery (smaller than ordinary AA batteries), a built-in modem, an radio receiving capability and fax software. This was in addition to all the Web browsing, electronic mail, personal information management, word processing and spreadsheet applications that came with the Windows CE 2.0 operating system. Most, if not all, however, were one of the software options for the Mobilon—a digital camera that plugged into the PC Card slot and was controlled using the keypad and screen of the Mobilon.

After using the Mobilon for the last six months, however, we would suggest that the great strength of the Mobilon is in its open screen, the convenience of the leather case, the well-spaced keyboard and the intuitiveness of the software.

Note: The older Palm Pilot Professional (which has an older PalmOS and doesn't come with the infrared port) is available for \$249 alone. Some of the Palm Pro can upgrade by adding an infrared module, which comes with an additional 2MB of memory and the software upgrade to PalmOS 2 for \$299 alone.

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- AMI BIOS with Intel Chipset driver function
- FCC Approved

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Casio**Exosope E-11**

Suggested Retail Price: \$200

Pros:

The Casio Exosope is a compact device that wouldn't be uncomfortable in a shirt pocket.

There are program-launching buttons on the front of the device (which also turn the machine on), and clearly-labelled function buttons along the left-hand side of the machine, including a selector wheel for scrolling through choices. All in all, navigation on the unit is quite easy.

The use of Windows CE as the operating system means Windows 98SE desktop users will be familiar with most of the operations already.

The PhotoTaker program allows the user to enter information either with the software keyboard or using their own handwriting on the screen. The Voice Recorder allows the user to record voice memos.

The machine supports infrared beaming between CE devices, and between other machines.

There is a Compact Flash Card slot.

The package comes with Microsoft Outlook 98 and a CD of bonus software applications. For added value.

Cons:

We were initially unable to make a connection to the PC because too much memory was used up by open applications. After a quick reset of the device, we were up and running.

There is a little rubber cover over the serial interface on the bottom of the machine, and it must be completely removed. Because of this, the cover is easy to lose. The good news is that leaving it off entirely shouldn't be a problem.

With a palm-sized device running a Windows-based operating system, space on the screen can sometimes be a bit tight.

The E-11 is quite nice, with great functionality and very intuitive labeling that makes it very usable. The biggest problem, as with all CE devices of this size, is that there is sometimes too much information for the size of the display. Still, this is a powerful little machine, and it makes a great choice for light use, where a larger screen isn't mandatory.

**Everex****Freestyle Executive A-20**

Suggested Retail Price: US\$299

Pros:

The very compact size makes it a great traveling companion. It would make an comfortable in a shirt pocket.

Card in + Compact Flash card slot.

The use of Windows CE means better meshing between the handheld and the desktop, and easier use for the experienced Windows 98SE desktop user.

The PhotoTaker application allows the user to enter data either with the software keyboard or by handwriting on the screen.

The Voice Recorder allows the user to record voice memos.

It supports infrared beaming between CE devices, and between other machines equipped with infrared.

The MobileCradle that connects to the unit's interface to a desktop PC can also be folded up into a traveling modem unit, which is powered by two AA batteries.

Batteries are pre-installed when the unit is shipped, with just the battery present power down until the user removes it.



The digital camera option is a lot of fun to use, but the quality of the pictures it produces is somewhat variable and you might be better to leave it for a real, stand alone digital camcorder if anything beyond fairly basic pictures. The portable radio could also be better, as you would do well to ensure that you bring along the power supply when you step out of the house with the Freestyle. Otherwise you could find yourself running out of power at the worst possible moment.

Power Source:

The Series 5 is a very much a case of a different color. It uses Everex's own proprietary EPIC operating system, does not include a built-in PC Card slot, uses a membrane-style display and runs on AA batteries.

The Series 5 also offers something that is more mature and capable than on any Windows CE 2.0 system. The word-processing application, for example, offers a great variety of formatting options while the spreadsheet is richer in functions than Pocket Excel.

It also comes with a Web browser, electronic mail software and audio recording functions. To use a modem, however, you either need to buy Everex's own proprietary Travel Modem or a PC Card modem adapter that allows just 16 low standard PC Card modems with the Series 5.

So if you need a machine with everyday battery life and don't mind giving up compatibility with Windows CE 2.0, a built-in PC Card slot, a color screen and a built-in modem, then the Series 5 could be a better choice. But think a lot to give up.

Guy Whittlewright is a Vancouver based journalist who specializes in high technology reporting. He can be reached at gwhittle@sympatico.ca.

There are four buttons for program launching on the front panel of the machine, and other control buttons along the sides of the device. All are within easy reach.

The Freestyle has vibrating notification in addition to index and LED, for notification of calendar appointments when silence is required.

Cons:

Initial connection between the Freestyle and the desktop was difficult. The machine would not detect the Freestyle while it was in the MobileCradle, but detected it with a direct serial connection. After the serial connection, the Freestyle would connect from the cradle as well.

The function buttons on the right-hand side of the Freestyle are not as clearly labeled as they could be.

The screen space is rather limited, especially with Windows menus on it.

Despite its smaller size, the Everex Freestyle is still a powerful machine, with 128M of memory onboard and the same functionality of the larger palm-sized devices. As with the larger devices, though, the limited screen space can still be a problem for some users. For light use, though, the smaller size and modest price make the Freestyle a very attractive option.

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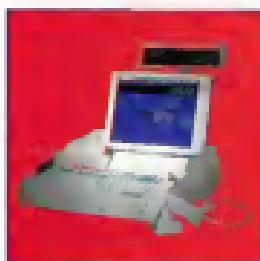
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Franklin
REX Pro
Street Price: \$399.95

Pros:

The REX Pro is incredibly small, as it comes in the same form factor as a PC Card. It comes with its own full-sized trackball (like a trackball for soft storage).

The 16MB of memory can store a lot of information.

Unlike earlier versions of the REX, the Pro model actually accepts input in a handwriting fashion. This makes it more flexible than before. The REX Pro has compatibility with parts of Microsoft Schedule and Outlook, Lotus Organizer and Symantec ACT!

Because it is set up as a PC Card, the REX can be plugged directly into notebook computers or HP PCs. It also has synchronization and data input. There are clocking options available for desktop users or for an additional \$49 extra price.

Battery life is roughly six months, using two tiny watch batteries.

Cons:

Input is quite awkward while entering data on the REX itself. The interface forces the user to scroll through the alphabet letter-by-letter to enter information.

The REX doesn't have the look of compatibility with major desktop applications that make the CE devices more appealing.

The REX Pro requires the docking station for full compatibility.

Although the REX Pro can accept user input when not attached to the desktop/notebook, usually it will best-suited for removal of information and clocking things off. It is quite possible to enter information via the buttons on the front of the machine, but it's more of an effort; that's worth it if there's little access to a desktop machine. After no basic organizer goes, it is impressive that no much can be crammed into so tiny a device.



Philips
Nino 320
Street Price: \$749.95

The Nino line from Philips consists of a variety of palm-sized CE devices. The Nino 320 is the base model, with 4MB of memory, for \$449.95. The Nino 322 includes 8MB and costs the \$699.95. The model we reviewed, the Nino 320 is essentially the 322 with the clip-on modem included in the package.

Pros:

The machine is very small and portable. Though it may be a bit large for the shirt pocket, it would fit into the inner pocket of a jacket without too much trouble.

Windows CE machines well with a Windows desktop machine.

The machine supports wireless roaming between CE devices, and between other Windows machines equipped with infrared.

The 320 comes with a membrane clip-on at the bottom of the device.

The Note Take application allows the user to enter data either with the software keyboard or by handwriting.

The Voice Recorder allows the user to record audio messages.

While in the hand, all buttons are within easy reach.

There is a Compact Flash card slot.

The Nino takes two AA batteries but also comes with a rechargeable battery pack, which is charged up while the machine is installed in the transfer cradle.

Cons:

The buttons along the sides of the machine aren't obviously labelled, which can be a bit confusing when the screen asks you to push a particular one by name.

The stylus included is a bit on the flimsy side.

The Nino was the largest palm-sized CE machine of the bunch, and the least-looking. Unfortunately, the style of the machine overrides the functionality a bit, as it requires clearly-labelled buttons for raised caps. This will force the user to do a lot of memorization before using the machine. Once learned, the Nino 320 is in package, offering 8MB of memory, all the regular advantages of the CE platform and a small clip-on modem. For those that want a palm-sized machine with lots of functionality, this is a great choice.

Editors' Choice**Overall Palm-Sized Device****Komai Palm II**

When it comes right down to it, the Palm II takes the lead because of one major thing: simplicity. The Windows CE machine is in this groupings trying to do too much fits for small a space, and with the overhead in memory, that's too overwhelming for such small devices. The Palm II, on the other hand, has very little overhead as far as the operating system goes, and is genuinely easy to use.



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Handheld Devices

These are definitely more in the line of power tools, where portability is concerned. They have larger color screens, and accept both stylus and keyboard input. In addition, they offer the ability to hook up PC cards and other external devices, making them much like a serious alternative to the notebook computer for doing on-the-go work. With a form factor still smaller than notebook computers (some can be easily tucked into a jacket pocket, purse or briefcase), it's no wonder that more users are considering these products.

The Windows CE interface is familiar for users of desktop Windows systems. The Windows CE-based handhelds reviewed all incorporate keyboards and stylus/pen input ports for without communications between users, or with a printer, for example. They also all include popular (and almost versions of Microsoft Word, Excel, Internet Explorer, Power Point and Outlook, including a calendar and scheduling. They all ship with a PC Card slot, but some also include a Compact Flash card slot, popular for storing e-mail with digital cameras, for example.

All the CE handhelds reviewed included a voice recorder capability, useful for recording such memos.

Hewlett-Packard**HP 880LX****Suggested List Price:**
\$1,411**Pros:**

The HP 880LX has both a PC Card slot and a Compact Flash card slot.

There are eight icons above the keyboard, which can be pressed to directly launch applications, as well as four to the right-hand side of the screen.

The machine includes a pocketable base of Quicken Express Able.

The HP 880LX is small enough to fit into a jacket pocket or a purse. The machine's docking station allows easy synchronization with the desktop.

The HP 880LX is fully compatible with the RDX organizer.

**Cons:**

The smaller pitch of the keys may prove rather awkward for many users. It is difficult to enter text with much speed.

The LED on the outside of the machine that shows the status of battery power also doubles as a voice record launch button. This can be inadvertently depressed inside a pocket, turning the machine on by mistake.

For a machine with a built-in keyboard, the HP 880LX is nicely compact and very portable. Because of the smaller size though, a lot of the逞ing is sacrificed. The smaller pitch on the keyboard can be a bit of a pain if used for extensive input. However, with the extra software included plus its compatibility with the RDX organizer, the Hewlett-Packard HP 880LX is bound to win a good number of fans.

Hitachi**HPW-200EC****Suggested Retail Price:** \$1,299**Pros:**

The case for the HPW-200EC is slightly larger than the Compaq and iPAQ machines, which allows a keyboard that is nearly full-sized. With this large keyboard, data entry is nearly as easy as on a desktop or a notebook machine. This added comfort in typing makes it a much more useful machine overall. Two buttons are included for selecting which user is operating the device.

There are nine buttons that turn on the machine and launch an application (four above the keyboard and five on the front of the machine). There is a Compact Flash card slot on the front of the machine.

A 3.5" hard drive is built in to the HPW-200EC.

There is one PC card slot for expansion.

The solar case of the device is sleeker and scratch-resistant, making it more suitable for life on the road.

Cons:

The longer form factor of this machine makes it a little harder to tuck away. A pocket or purse would have to be extra-large to comfortably fit a machine of this size.

Though its larger size makes it a little less portable than some of the other handheld devices, it is nonetheless a beautiful little machine that is well-suited to serious work on the road. The large keyboard is the key, although the smaller machines have the same kind of power; the Hitachi machine is comfortable enough for extended periods of time and would be a great alternative to a notebook computer for many users.

Compaq**PC Companion 2010c****Suggested Retail Price:** \$1,250**Pros:**

The PC Companion is small enough to fit into a jacket pocket or a purse.

The docking station that comes with the PC Companion allows easy synchronization with a desktop machine.

There are nine applications that can be launched with a function key sequence.

**Cons:**

The keys on this model's keyboard are rather small, making it difficult to type with any kind of speed. Experienced typists may find their fingers cramping up.

The placement of the Voice Memo button on the outside of the machine makes it possible to turn the machine on accidentally.

The PC Companion is one of the smaller devices in the group, easily tucked away in a pocket for transport. Inside that small package is a lot of power, making it a great machine for taking notes, working on documents, spreadsheets or presentations. The only real down point to this machine is the smaller keyboard pitch, which may be a bit painful for extensive input. Otherwise, it's an impressive package.

**LG Electronics
Phonex Express**
Street Price: \$1,299



Overall Handheld

Pros:

The larger form factor allows the Phonex to sport a nearly full-sized keyboard, for easier data input. The built-in modem is fast, at 56Kbps. The battery swivels back to prop the keyboard up at an angle. When it is set up like this, a video port and a printer port are revealed. There are also slots behind the screen of the Phonex, for application branching and system control.

Cons:

The larger form factor makes it a bit more difficult to pack the device away. Because of the extra features behind the swiveling battery, it's the deepest machine in this roundup. There is no dedicated Compact Flash card slot, although the user can still put flash memory in a PC card adapter.



In addition to the added usability as a result of the larger keyboard, the inclusion of the monitor and printer ports make the Phonex a truly impressive machine, great for doing work on the road or for portable presentations. This is about as close to a notebook as you can get without pressing the lens into sub-notebook territory, and it's wonderfully designed, too.

Palm Pilot Open Wireless
by Steve Dardene

When you have the lap sailing handheld device on the market, what do you do for an encore? Well, 3Com Corp. has announced the newest member of the Palm Computing family, the Palm VII although it won't ship until the middle of next year.

The product links the same basic concept that has made the Palm line such a success and adds wireless connectivity. Despite the somewhat replaceable (but user-installable) other wireless computing devices, 3Com is confident that the Palm VII will be a success in this arena, for a few reasons.

Other devices have required the user to fumble the hardware separately from the software, and never required the user to find a way to make them work together. Through a partnership developed with wireless service provider Bell South in the U.S., 3Com has promised that putting a Palm VII user on line will be as simple as flipping up the antenna of the device, entering a credit card number and pressing "Go." The device will already be set up with a wireless solution (called Palm Net).

Secondly, the small size of the screen forced the Palm team to consider just the way the device should connect to the Internet. Using the standard browsing paradigm, in 100 to 150 pixel screen is deemed to be inadequate. To combat this limitation, the idea of "Web dialing" was introduced. By juggling up with some of the most popular content providers on the Internet, 3Com was able to reduce browsing to a query-and-response approach that uses a minimal amount of data transfer. So, instead of plowing the browser to a certain provider's page, that page's URL is passed to both the query page and the results page already loaded on the Palm VII. All that is transferred over the wireless connection is the data that fills in the blanks (or both pages).

This delivers basic information in a compact form, chopping off bulky graphics and extraneous information. Further, while a limited number of partner companies will have their query-based applications included on the device at the time of shipping, others will be made available for import to develop similar tools. A beta version of the Palm VII will be in field trials in early 1999. 3Com hopes to ship the final version in mid-1999 for less than \$1,299. **[ED]**

**NEC
MobilePro 770**
Suggested Retail Price: \$1,299

The MobilePro 770 is based away from NEC, and is one of the first machines to make use of Microsoft's new Windows CE Pro operating system (code-named "Dolphin").

Pros:

The larger form factor of this device allows for a nearly full-sized keyboard for easier and quicker keyboard input. The internal modem is a speedy 56Kbps. The track screen is capable of 16,000 colors, instead of the 256 colors on most palm machines. There is an additional port for VGA output, allowing the user to use an external monitor for presentations. There are 10 buttons for application branching, which also turn on the machine. There is a Compact Flash card slot, for additional storage. The machine includes pocket versions of Microsoft Access and Puma's Instabase.

Cons:

The larger form factor makes the machine harder to pack away for transport.

Armed with the newest version of the Windows CE operating system, a speedy modem, more colorful screen and the ability to hook up a monitor, the MobilePro 770 is already an attractive device. With the full-sized keyboard, it is certain in making NEC's goal for speed, width, and portability. This is a great alternative to a notebook for the user on the go.



Editors' Choice

Overall Handheld

LG Electronics Phonex Express

Although the Hitachi and NEC machines were also very impressive devices, the LG Phonex gets a few extra points for a bit more money. It has a very usable keyboard, a great design, and has the monitor port and printer ports built right into the device. For a portable presentation machine or for doing serious work on the road, this one is great. **[ED]**



**Steve Dardene or Edie Neal
Editor for Consumer Computer Wholesaler (based in Toronto), he can be reached at steidd@sympatico.ca**

Handheld PCs

Bread

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Spotlighting 3D Graphics Accelerators

by Graeme Bennett



Graphics cards

continue to be one of the hottest product categories in almost every segment of the computer market. And a great graphics card starts with a great chipset.

A few of the hottest-selling cards based on the NVIDIA Riva TNT, the Voodoo Rave (and its add-on cousin, the Voodoo and Voodoo2), the ATI Rage Fury (which we think will be quickly supplanted by the Rage 128 GLA), the 3DLabs Permedia 2 (plus by the forthcoming Permedia 3), the S3 Savage 3D and the Matrox G400. (The hot-to-the-point Intel 7400 is notable for its low price, which helps make up for its somewhat lackluster performance.)

In the on-line SuperTest at <http://www.pcnewspaper.com/test/reviews/gfx/index.html>, we evaluated graphics cards based on a number of criteria: image quality, 3D and 2D image quality, ease of configuration, performance and features.

Gaming Card Recommendations

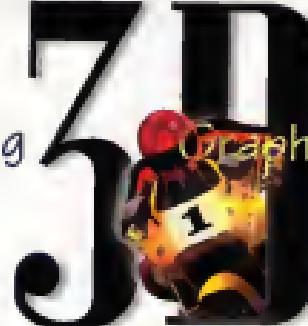
For someone intending to play a lot of games, we'd recommend a Riva TNT-based AGP card (The Creative Labs Graphics Blaster Riva TNT card was named "Editor's Choice" in the Dec. 1, 1998 issue of *PC Magazine*.) You can always add a Voodoo3 later, if support for Glide (the proprietary API used by the Voodoo-series cards) is desired. The TNT-based Spectra 2500 and from Creative has a special Voodoo2 pass-through connector built in (and it fits).

Despite the Viper 350's slightly higher performance in some areas and the Creative Labs card's "Permedia" game bundle, the Spectra 2500 is thus our recommended choice for dedicated gamers (especially those with an existing Voodoo or Voodoo2 card), for although it comes with no bundled games, its graphics quality and features are the best overall. For value-conscious buyers, the Creative Labs TNT-based model is our value pick; for its aggressive price and well-implemented software. For those who want maximum performance, the Viper 350 is the speed king.

It's worth mentioning the color-display limitations of the Voodoo or Voodoo2 cards. These chips can display a maximum of 16-bit color during 3D acceleration. Some of today's texture-intensive games, which put layer upon layer of transparency on-screen, can result in a distorted or blurred display that points to the advantages of chips such as the C380, TNT or, especially, the Rage 128 that can display 24- or 32-bit color. The Rage Fury, based on the Rage 128 GL chip, is already causing concern for being able to handle true-color displays while maintaining frame rates comparable to the Voodoo2. The S3 Savage 3D generally impressed us with its performance, especially considering the horror stories we'd heard about early driver problems. Still, the severity of a 3DMark demo display anomaly we noticed makes it a potentially problematic card for gamers. Although the chip flies an uphill battle with all the negative press it has received, we were pleased with the price/performance prospect of the AOpen Navigator PA70.

Multimedia Card Recommendation

Both the ATI All-in-Wonder series cards and the Matrox Marvel G330-TV are excellent "all-in-one" solutions, but the Matrox card's better 2D and 3D performance and superior video capture and TV output technology earn it our vote in this category. For those who prefer video capture and live-rate 3D formats, the Rage Fury is compatible with ATI's recently announced TV Wonder add-on card, which provides most of the functions of the All-in-Wonder but retains my graphics card. (Matrox Millennium, Hyperplay and some S3-based models are notable exceptions, due to their lack of support for the overlay mode the TV Wonder requires.)



Manufacturer Listings

3DLabs — <http://www.3dlabs.com>

ATI — <http://www.ati.com>

Creative — <http://www.creative.com>

Crossair — <http://www.crossair.com>

Diamond Multimedia — <http://www.diamondmultimedia.com>

E3B Technologies — <http://www.e3btech.com>

EVGA — <http://www.evga.com>

GeForce — <http://www.nVIDIA.com>

Intel — <http://www.intel.com>

Leadtek — <http://www.leadtek.com>

Matrox — <http://www.matrox.com>

Number One — <http://www.number-one.com>

NVIDIA — <http://www.nVIDIA.com>

Permedia — <http://www.3dlabs.com>

Rage — <http://www.rage.com>

Rendition — <http://www.rendition.com>

S3 — <http://www.s3.com>

Tektronix — <http://www.tektronix.com>

SPD9 — <http://www.spd9.com>

Looking for the latest drivers for any piece of hardware in your computer? Check:

<http://www.silentsys.com>

<http://www.leadtek.com/drivers/>

<http://www.madrona.com>

For Further Reading

Comparing 3D graphics cards

<http://www.pcnewspaper.com/test/reviews/gfx/index.html>

<http://www.nVIDIA.com>

TNT Troubleshooting

The Diamond driver supplied with the Viper 350 card does not update the Windows registry correctly, and may result in an "Error occurred in SPXLEDP" error message.

To fix it, use RegEdit to edit HKLM\Software\Diamond\Control\Display\SharedPropertySheetHandler.

We will run one or more keys named Diamond_Safe and clean up after it working again.

Graeme Bennett is a regular CCW columnist and Senior Editor of *The Computer Paper*. He can be reached at graeme_bennett@jag.ca.

A board with arguably the best manufacturing quality overall is the Digitek MBX440-03.

The Global Multimedia MBX440-03 was one of the few motherboards tested that has on-board audio.

A board like the Digitek Pro 440BX shows how easy it can be to overclock a decent CPU.

Under the Hood: MOTHERBOARD

In the previous three parts of CCW's motherboard test (September October and November issues), we reviewed 105MHz Super 7 and 100MHz Slot 1 motherboards from a number of angles: features, performance, documentation and reliability. In this last section of our roundup of 100MHz boards, we will flesh out each board's pros and cons by looking at not just benchmark tests and feature comparisons

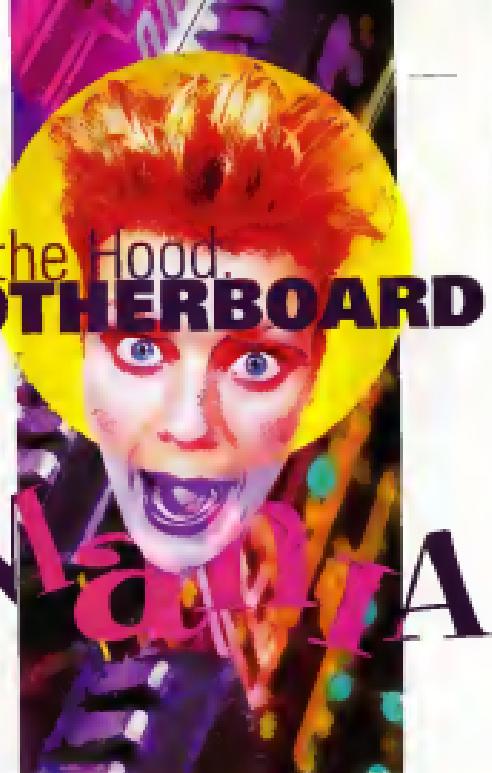
Slot 1 Boards

The Dell BS-100 compares very favorably with its competitors' speedtest, rating a bare-bones class HATPC score of 329. It includes an onboard UltraWide SCSI interface feature that puts it squarely in a class of boards well-suited for server or high-end workstation applications. Sporting an onboard Adaptec (dual-channel) 7400LW SCSI chipset and a DualPort II slot, the board was fairly easy to physically set up (extremely tight DIMM socket notwithstanding) and the CPU speed jumpers were easily configured. However, we noticed more plug-and-play woes than with any other board tested, including an unidentified ATI graphics card, network card not working correctly, plug-and-play BIOS showing up in Device Manager with a yellow Alert symbol, and so on, even with the BS-100 than we did with any of the other boards in this test.

Also, when configuring using the recommended settings and PC100 SDRAM, it failed to complete our benchmark test twice before finally succeeding. While these problems were extremely easy to solve, they were troubling. Another complaint is with the obscure, and in some cases nonexistent, labeling of the Power (HDD and Reset pins) to which the various and sundry pins of a case are affixed. The manual is more and more of the required pins are not marked with any legend at all. Like virtually all the BX boards we tested, the BS-100 ran with both standard (66MHz) cache and PC100 SDRAM.

With a HATPC score of 329, the Dell BS-100 was the fastest motherboard tested, and that's certain to appeal to many people.

We also tested the Intel BD-100, a five-PCI-slot motherboard without SCSI. It croaked during our benchmark tests and exhibited some plug-and-play device configuration problems with our test



configuration's network card, but otherwise made a strong showing with an impressive 325 HATPC score, tying with the ADiPEN AMBII as the second-fastest board tested. Both Dell boards lacked advanced features such as the option to set the default display to AGP, ACPI support, or the option to turn the fan off during suspend.

The dual-CPU IBM P220BLD maintained was a breeze to set up. Virtually all the jumpers and connectors are labeled very clearly, there are no DIP switches or jumpers to set, and all CPU and bus speed configuration is handled via the system's Award BIOS. However, we are definitely coming to the conclusion, after our experience with this board and the one from Shuttle, that we don't care for the unique retention brackets these models use with little plastic pins to hold the bracket in place. They are a hassle to install — especially if you don't press on the mount heavily enough to get it to snap completely into place before pressing in the plastic pins. We managed to press the pins into place before realizing that the mount wasn't pressed down far enough. Good luck getting the pins out if this happens to you.

The system's Award BIOS provides the option to configure the AGP card as initial at first — a feature we think is a great benefit to Windows 98 or NT 4.0 users who want to run multiple display cards. While we were delighted to have five PCI slots available, we were surprised by the consistently close tolerance between this board's AGP slot and the primary CPU socket. No kidding — there's less than one-millimeter of an inch between the sockets, and even less space between the pins of the top of our WinFast 2300 AGP-card and the edge of the Pentium II chassis.

Perhaps that's why there's a connector labelled "AGP I/O" on the motherboard. Benchmark results for this motherboard were slightly below average, with a BAFCo score of 313.

The DFI P2300LS is a single-CPU motherboard with an onboard Adaptec 3940 UW SCSI controller (supplying, source, write and DMA2 SCSI commands) performed similarly and offered comparable options to those mentioned above. Like several other boards tested, its default BIOS configuration conflicted with our network card — in this case, requiring us to disable or reconfigure the interrupt of the USB controller. The results for all the DFI products we tested were excellent. We liked the unconventional but convenient placement of the bank of power, HD reset and power switch connection out of the way of the expansion slots too. We encountered two crashes during our benchmark tests of this board, which yielded a BAFCo score of 311.

Curiosity finally got the best of us after reading in both *Aho Amico* about a "Turbo" mode that boosts the external clock frequency by 2.5 per cent. We ran a test on the Abo BM4 with Turbo mode on and were struck. It boosted the benchmark score and added reliability (just like they wanted it to do). Set back to normal, the BIOS earned us a score of 313 — somewhat lower than that of the BM4 (reviewed in CNET's November issue). Like several of the other boards tested here, the BIOS failed to auto-configure our ISA network card. A BIOS update on the company's Web site (<http://www.alter-way.com>) adds the option to the BIOS to set AGP or PCI as the default display and adds ACTI support. (The BM4 also provides this feature.)

Aboard like the Digitek Pro 4400S shows how easy it can be to overclock a socket CPU. Its SeePU software easily overclocked our 350MHz CPU to 400; we set it back down, of course, before running the benchmarks. It was one of the easier boards to set up, with a convenient flip-up expansion bracket for the CPU and a number of the features we look for in better boards: SMART hard drive capability, a "fix off during suspend" option, poly-phase overcurrent protection, a chassis intrusion circuit, and a power failure recovery manager allowing the computer to automatically turn back on after a power failure — also offered by the Althon AX80, but not normally possible in ATX-powered systems. Although it scored low, with a BAFCo rating of 311, it earned extra points for its automatic and trouble-free configuration of our ISA network card and other components.

The Transcend TS-ABS was also very easy to configure, and we liked its advanced BIOS, with recommended CMOS settings and the ability to set an AGP or PCI display as default. It tied with the Matsonic MS700B in our benchmark tests, with an under-par 313 (just behind the Shikha HOT-861's 314 score).

Aboard with arguably the best manufacturing quality overall is the Elgroup P400X-A+. This well-designed, Taiwanese-built BX-class board has locking clamps on the drive cables, a quick-release retainer bracket (both parts that actually work well!) and requires no jumper configuration at all — the CPU speed settings are all handled by the Award BIOS, along with other features we've come to associate with better boards: SMART hard drive compatibility, ACPI support, CPU fan off in Suspend mode, Boot from LAN, and PC health monitoring (as usual, requiring an optional hardware monitor IC chip). Probably as a result of its ACTI capabilities, it was one of the better boards at entering or exiting Suspend mode via software commands or the press of a user-requested Sleep button. The P400X-A+ includes an SB-Lnk connector and five PCI slots. It had no problems auto-detecting and automatically configuring the ISA network card that gave several of the other boards trouble. Performance, however, was at the bottom of the pack, yielding a lowest overall score of 309 on our BAFCo test (still readily faster than the fastest Socket 7 board), when configured with "Optimal" settings and standard disk drivers.

Based on the much more positive statements at other trials we've read (such as at <http://www.silicon.com/~jmcpherson/cmp.htm>), we revisited the board with the HighPoint Rocket Pro 160 interface (IDE drivers from the Elgroup Web site, which produced an appreciable improvement in the score (Windows 98 has built-in bus mastering drivers).

The Global Multimedia MB344045 was one of the few motherboards tested that has on-board audio (it can be disabled, if desired). The on-board audio features 3D surround effects and Yamaha's SoundSync software wireless synthesis technology that sounds surprisingly good. An SB-Lnk connector is also provided for PCI audio card compatibility. The board features several other attractive features, as well, including the ability to de-select an AGP or PCI display/ACPI and a wide range of hardware monitor functions, and another unique feature: no shared PCISA slot. The board and manual were both of high-quality, and our PC100 500RAM fit easily into the board's three DIMM slots. The board was so easy to configure and plug-and-play worked so flawlessly, it reminds us how much of a pain some of the other products tested have been. (We used Windows 98's WDM drivers for the audio; Windows 95 or Windows 3.1 DOS3 drivers are supplied in CD, along with Yamaha's "Audio Rack" software for CD, MIDI and Wave playback.) This motherboard sailed through our BAFCo benchmark tests with many no-coms, scoring 316.

Another sound cranked board with easy setup, along with the Digitek Pro 4400S, is the easiest one, thanks to its BIOS-based SeePU setup utility and sensible board layout, was the Matsonic MS700B. An onboard Yamaha YM701F chip provides 64 sound channels, full-duplex and 3D effects and hardware acceleration compatibility with Microsoft DirectSound/Direct Music. An advanced

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wavetable synthesizer uses system memory to provide wavetable playback. Sound-XG software support, DLS (downloadable sound) Level 1 and an SB-Link connector for PCI audio cards round out the audio aspect of this board. We also liked the inclusion of a master with important hardware settings, and the ability to power off the fan when suspended. The board rated near the bottom in our BAFCo tests, scoring 313.

The Soltex SL-67B was a hassle-free board. It provides an SB-Link connector and runs the benchmarks without interruption, rating a BAFCo score of 312. The system's BIOS provides overclocking possibilities of 110, 112 and, for the brave, another 113MHz setting. We also liked the easy-to-understand DIP switches and legend fluorescent overlay on the motherboard. It all adds up to make the slumpy one-page manual almost adequate. Our only complaint is the awkwardly positioned bank of pins for connecting the power, IDE and case switch wires. The pins are positioned in such a way that they interfere with seven-each or longer expansion cards in no less than three slots.

In contrast, we had so many problems with a Lucky Tech XH-P60X2, we feel the board must have been defective. For starters, it crashed regularly (using recommended BIOS settings) when an ISA network card was installed, and it froze every time we attempted to write a file to a floppy disk. Interestingly, it scored a 59 in our BAFCo test when the network card was installed, but a much better 317 when the card was pulled. Although we can't explain these anomalous results, it's worth mentioning that the well laid-out board was very easy to set up and configure. We've asked the company for a replacement motherboard.

The Legend-QDI PR4400X Retailer 1 motherboard was a delight to set up. Automatic SpeedEasy BIOS configuration of the CPU

means no jumpers at all to set, and the plug-and-play worked flawlessly. The board features the option to select AGP or PCI as the default display and features fan-off during suspend, ACPi, SMART hard drive capability — all among the features we think today's motherboard buyers should focus on. The Brilliant boards feature the best random PC component capability of all the systems we tested. Dubbed Management, the technology allows monitoring a remote computer's status, managing its hardware, and monitoring of more than 100 aspects of the computer. It rated a very respectable 304 in our BAFCo benchmark test — the third-highest of all boards tested (The Soltex 1 boards from Inwil and ADyna were first and second, respectively.) We also ran the tests again without a network card to find out whether the overall score increased, as it did with the Lucky Tech board — it did not. This board is highly recommended!

Super 7 Boards

The Inwil XA-100 was easy to set up, a slimy one-page quick reference sheet notwithstanding. It earned an respectable BAFCo score of 283 — not the highest, but well above some of the others in the Socket 7 arena. The XA-100's jumpers were very convenient to set, thanks to standard plastic handles on the jumper connectors.

For a product the brochure claims is "jumper free," we sure had to set a lot of jumpers on the Lucky Star SAMVPI, a VIA MMF-based board with the most complicated jumper arrangement of all the motherboards tested. Consistent with our experiences with other MMF-based boards, this motherboard proved exceptionally troublesome to properly configure. In fact, we had to run the benchmark test three times to get a usable score. The first test failed, in the second test it scored a dismal 102 Persistence paid off, however. A third test produced a BAFCo score of 363. There were other peculiarities, as well. For reasons unknown, it was the only board tested that wouldn't work at all with our Seagate Medalist Pro hard drive and Creative Labs CD-ROM combo. We had to replace either the CD-ROM drive or the hard drive to successfully boot the machine. In one test, we substituted a Fujitsu MPB030AU drive; in the other, we pulled the Creative Labs CD-ROM and substituted a different one. Of course, the "trouble-making" components worked fine with other motherboards. It was also one of the few boards tested that absolutely would not work with my 3Com 10/100basetT PCI card and we moved the card to a different slot than the shared PCI slot we first tested it in. On the brighter side, no inclusion of both SIMM and DIMM sockets. DMII of Level-2 cache and an USERRS pin may appeal to cost-conscious upgraders. This board is not recommended.

And just to prove you can't make generalizations, a board we had a lot of trouble configuring was the MSI MS-8169 — an ATX-form Super 7 motherboard using the usually trouble-prone VLB chipset. The MS-8169 proved unusually tricky to configure with a 3Com EtherLink XL TPO network card, despite a considerable amount of fiddling with BIOS settings and the like. Obviously, it wouldn't work at all until we substituted a different 3Com EtherLink XL card, configured it and then swapped the original one back in. However, once we got it up and running, the MSI board was fast, rating a mid-tier third-place 279 score on our BAFCo tests. As well, we really liked the board's overall product quality and the printed documentation.

Thanks to White Knight Distributing (1-800-669-6180) for supplying us with cases and components for these tests.

To see the specifications on these boards, please visit <http://www.computerpoweruser.com/motherboards/specs/>

Greene Bennett is a regular columnist and reviewer for Canadian Computer Wholesaler and a Senior Editor at The Computer Paper He is based in Vancouver and can be reached at greene_journeys@pc.com

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Serving Up Solutions

by Jeff Dague

When the personal computer was invented in the late 1970s, virtually all IT professionals regarded the PC as a toy.

Five hundred million PCs later, knowledgeable people now claim that the Internet has made the concept of the stand-alone computer obsolete. The Internet, with its Web server/browser paradigm, has become the universal networking technology. As computer users, ranging from the home to the multinational enterprise, come to depend more and more on Internet-based networking services, we must inevitably see the return of the age of centralized "big iron" computing, with massively scalable servers connecting to millions of widely distributed network client computers. That, at least, is the conventional wisdom of the late 1990s.

But what kind of server solutions will be the winners in this new age? What hardware architecture, what operating systems, what databases, what applications and what data pipe technology will combine to provide the sweet spot for manufacturers, resellers and users?

There are two major and opposing visions for success in the server market: the Microsoft-centric view and everybody else's. Even as Microsoft and its allies attempt to move Windows up from the desktop to the highly scalable, reliable enterprise server, the major competitors—including Sun Microsystems, Oracle Corp. and IBM—are proposing server solutions which, at their most radical, don't include any role for Microsoft Windows at all. Just to complicate matters further, all the major server technology players both cooperate and compete viciously with each other. As the computer industry continues its consolidation with an apparently endless wave of mergers and acquisitions, former allies find themselves owning competing products, and adversaries look for ways to make money by becoming part of their competitors' solutions.

In the Beginning...

High-end enterprise server technology vendors such as IBM, Sun and Oracle got their start in a world where availability and central network control were the paramount laws. The computing model that made sense was a powerful mainframe that held data and applications centrally, and allowed terminal users to access both the data and the processing power of the big iron computer. This model was challenged and then blown apart by the PC, which gave individual users freedom to choose (in important respects, especially in America) what software or hardware they wanted to access. The personal computer, as developed by Apple and others, also became a fractal experimental garden for making computing easier and more fun—the concept generally ignored in the mainframe world. After awhile, computer users wanted their more flexible, responsive personal computers attached to a network. Novell, with its NetWare network operating system, was the big winner in the race to connect the PC to computer networks.

The Rise (and Fall?) of Client/Server

Client/server computing, in theory, offers the best of both worlds. But it's been a rocky relationship at best, mainly for cost reasons.

According to a long series of studies by companies such as the Gartner Group, the flexibility of the personal computer brings with it a huge annual operating and maintenance cost, of between US\$7,000 and US\$15,000 per year, per IPC. This is unusually expensive, and has provoked a very serious search for an alternative computing model to

Is the server market moving towards a world of millions of tiny Microsoft NT servers? Or is it evolving towards a few Really Big Servers?

Will NT beat Unix as the winning server operating system?

Could Linux beat everybody?



BY JEFF DAGUE

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| Formatted Capacity (GB) | 1.4 | 3.2 | 4.4 | 1.3 | 8.4 |
| Read/Write | 6/3 | 5/1 | 4/2 | 3/1 | 4/2 |
| Average Seek Time (ms) | 18 | 10 | 30 | 18 | 10 |
| Data Transfer Rate (MB/sec) | | | | | |
| To/FROM Buffer | | | | | |
| ATA/IDE | | | | | |
| • PIO Mode 1, Multiword DMA Mode 2 | 10.4 | 11.4 | 16.4 | 34.4 | 11.4 |
| • Ultra DMA | 33.3 | 33.3 | 33.3 | 33.3 | 33.3 |
| Buffer Size (MB) | 512 | 512 | 512 | 512 | 512 |
| Access Speed (MB/sec) | 5.000 | 5.100 | 5.400 | 5.400 | 5.400 |
| Warranty (years) | 3 | 3 | 3 | 3 | 3 |

| CD-ROM Drive Specifications | |
|-----------------------------|---|
| Speed | 2X |
| Interface | IDE Bus, 22 MHz/80ns |
| Access Time (ms) | 120 |
| Data Transfer Rate (mb/sec) | 1.394 |
| Access Time (1/2 track sec) | 16 |
| Cache Memory | 128K |
| Supported Disc | CD-RW, CD-R, CD-ROM, CD-RW/CD-R, CD-RW/CD-R |
| Warranty (years) | 3 |



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offer the benefits of client/server at a much lower cost.

The Network Computer

The Internet has been the key to reforming the client/server model. A big server, running Unix or some other high-end operating system, a powerful database and customized applications, is still a good idea, especially from a management cost and control point of view. The increase in the power of servers, combined with declines in the costs of hardware, has enabled entirely new classes of applications such as data warehousing, 3D visualization, and large-scale, cheap electronic commerce. The Internet and Sun's Java programming language have allowed almost any kind of computing device to be connected to a server, and to be able to access data and applications. This cross-platform compatibility would seem to offer a great potential to profit from under the Microsoft "monopoly," but most end-users want the combination of Internet access to big server databases and the flexibility of owning and running applications that are resident on their own computer. In other words, end-users want a part-time network computer for whom they need to be connected, and a personal computer when they don't need to be on-line.

Who Cares, as Long as It Works?

In a sense, all the competing products and corporate philosophies are becoming united on terms of the ideal that they aim to achieve, which is a connected, wired planet. Computing devices soon decreased to get very cheap, very small and very powerful over the next decade. At the same time, network connectivity, whether by fiber optics, high-speed cable and phone lines or wireless, will make dependence on servers increasingly common. The development of common standards on the Web, with HTML and Java as the basic universal data and software types for end-users, means that the specific server solution can be invisible to the end-user.

What's important is that it works. All the makers of server technology admit that servers are still much too complicated, expensive and unreliable. All the major players promise that sometime, everything at a top priority — the creation of server hardware,

operating systems, databases and networking products that are self-installing, self-maintaining and self-healing.

According to a study by Dataquest Inc., there will be a market for a new class of "thin" servers, which could amount to US\$16 billion per year by 2002. A thin server is essentially any server which has been simplified and shrunk-down into a shrink-wrapped appliance that can be unpacked, plugged in, and operated with a minimum of trouble.

The Contenders

Several companies dominate large parts of the server pie, though nobody currently owns all the technology for a true end-to-end server solution. They all rely on a network of other technology suppliers to create a solution. This is where the big opportunity for resellers lies, in putting together and customizing server solutions customized to an individual business's needs.

NetScorp Communications Corp.: Until its recent acquisition by America Online Inc., NetScorp had done more to establish the Internet as the universal networking medium than any other company, by creating a browser which let tens of millions of users of all kinds of computers navigate the World Wide Web with minimal training or effort. The company was well on its way to becoming a key developer of Web server and Web-based applications when it was acquired by AOL and its "portal."

It was one of the fastest sites on the Internet. If NetScorp continues to exist as an engine of new technology, the new connection to AOL and Sun may be a means of protecting it from the cold blast of Microsoft's competition.

Microsoft Corp.: Microsoft's big strength is a lock on hundreds of millions of desktop PCs as the key software categories of operating systems, applications and Web browsers, plus the common look and feel of the graphic user interface of Windows, from Windows CE for handheld computers to Windows NT. A big weakness is the unreliability of a high-end operating system and server software, including Windows NT, Linux to be renamed Windows 2000 and Microsoft SQL Server, which suffer in comparison to the reliability, speed and availability of Unix-based server

solutions. However, Microsoft is fast and persistent, and it has secured the aid of thousands of third-party developers.

The recent release of SQL Server 7.0 represents a huge upwards jump in the performance and reliability of the key Microsoft database for Intel-based servers. NT 4.0, when it eventually ships, should also be a major incremental improvement to Microsoft's server and workstation operating system, though it will probably still lag behind Unix, especially in large-scale enterprise installation.

Nevertheless, Windows NT is currently by far the most popular operating system for new server installations, and is likely to remain the principal opportunity for server solution providers looking for new business. Oracle's big challenge is to improve Windows NT/95 so that it is really reliable and reliable.

Interestingly, in conversation with CCTW Microsoft president Steve Ballmer admitted his company is very interested in writing Windows 2000 and SQL server because the basis of big iron server solutions, which would provide enhanced server solutions to small- and medium-sized businesses, along the lines suggested by Oracle CEO Larry Ellison. But, can Microsoft can get there before Oracle does?

Oracle Corp.: Led by the flamboyant, easily dressed and glibly Bill-lauding Larry Ellison, Oracle is the leading supplier of database software, which is the basic element of enterprise server systems around the world. Oracle 8i, released shortly before Microsoft's SQL 7, is much more reliable, scalable and faster than anything that Microsoft can currently offer. In dollar volumes, Ellison claims that the NT version of Oracle out-sells SQL Server, on Microsoft's own Windows server.

Ellison is also a relentless critic of the proliferation of huge numbers of tiny NT servers. Over and over, he makes the point that decentralized servers are a "very bad idea," sucking up huge people resources and costing huge amounts of money to maintain. Instead, Ellison claims, their compact reuse will soon lead to corporations jettison their NT server experiments, and reverting to the older model of big iron computing.

Ellison's competing vision is a combination of the old and the new: the old "bigger is better" theory of servers, combined with the new, universal Web browser technology. Reducing total cost of ownership requires much smaller numbers of centralized, vastly



Enclosed server



Server farm

powerful and upgradable clusters of servers (Unix-based and built by companies such as Sun, HP, Silicon Graphics or IBM), running Oracle database software (of course), said Ellison. Microsoft applications would be distributed to users via Internet technology.

Ellison was the early big booster of the Network Computer concept for a low-cost new-age terminal device, which simply uses a Web browser to access applications and data from the server, avoiding the cost and maintenance overhead of the traditional PC client. Among the lukewarm sales of true Network Computers compared to PCs, Ellison always and claims that when a PC is connected to the Internet using a Web browser, it becomes a network computer. Ellison predicts that in the next five years, outside server companies will manage smaller computers' databases and networks needs. Ellison claims Oracle will be active in creating on-line business services to make this vision a reality.

See Microsystems Inc. See founder and CEO Scott McNealy is one of the major agitators in favor of breaking up Microsoft on antitrust grounds. He sponsored the development of Java and popularized the phrase "The network is the computer" — which sums up the potential of the Internet to unite all the computers and databases in the world into one big, unified whole. Sun is the major platform for high-performance Web servers, most often running Oracle database software. Sun has also promoted the Network Computer, though with limited success when compared to PC sales.

IBM Corp. IBM owns the highest level of the enterprise computing market with its AS/400 and AS/480 based systems, but it has also moved strongly into the small-to-medium-sized server market with its Netfinity line of servers, running versions of Unix or Windows NT. The Netfinity line boasts technology derived from IBM's mainframe computing expertise, to provide a high level of reliability and scalability to its low-cost server solutions.

Compaq Computer Corp. Compaq has long been a leader in the corporate desktop PC market and it also offered a popular line of ProLink Windows NT servers. However, it went from being a relatively niche player in the enterprise server picture to a major player when it acquired Tandem Computer, then Digital Equipment Corp. Along with these companies, Compaq inherited a Who's Who of corporate and government server customers and a diverse non-Wintel product line. So far, Compaq has done an impressive job of integrating different technologies into what had been, in the dramatic words of Sean McNealy, merely a "personal" comput-

er company, not a "real" computer company.

Compaq has had left with major strategic allies such as Intel (complaining that Intel didn't give it favorable chip prices when considering its huge buying scale), and Microsoft (since Compaq is now a major player in other high-end operating systems such as Unix and VMS, through its Tandem and Digital product lines). Linux: The dark horse in the race is a wrily, non-commercial, free-form operating system called Linux. Developed originally by Linus Torvalds, its broad-based fan base is a life of its own, inspiring a global village of open source software enthusiasts.

Linux is a remarkable operating system, based on Unix but existing in variance for computers ranging from Intel to the old Compaq/DEC Alpha. Linux is inherently stable, economical and powerful. It is widely used as a server operating system, and is gradually attracting a host of real commercial

third-party applications from companies including Informix and Corel.

The Future

Sometime around the end of 1999 or early 2000, a new computing architecture will appear on the market, with the launch of Intel's IA64 chip. This new generation of processor will enable extremely powerful, inexpensive servers to be built, which will readily run Windows, Unix or Linux on the same computer. At this point, all the players in the server market, from hardware makers like Sun, IBM, Compaq, Hewlett-Packard and Silicon Graphics, to software giants like Microsoft, Novell, IBM and Oracle, will be judged on a common playing field.

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Cloning Software

The word cloning makes most of us a little uncomfortable, probably thanks to an excess of bad science-fiction novels and movies. And the real-life news stories of genetic manipulation — even cloning fuzzy animals like sheep — aren't enough to make us feel at home with the concept. But software to clone entire systems can prove useful in a number of cases. Businesses faced with setting up tens, hundreds, or even thousands of newly-purchased systems can appreciate the time saved in having to install the collection of software just once, then cloning it onto as many machines as needed.

Individuals may appreciate cloning software as a replacement for traditional backups, with some unique advantages. And companies producing or distributing hardware may find it an ideal way to easily produce systems with just the configuration desired by their customers. Vendors of systems OEMs can use them to create image disks to distribute with new systems, allowing customers to reformat their machines to the original state.

We looked at two system clone utilities: Drive Image 2.0 from PowerQuest Corp. and Ghost 5.0, originally produced by New Zealand's Bratty Research, but now sold by its U.S. parent, Symantec Corp.

Both offer similar useful features — both are, at least, DOS programs. Drive Image will happily add icons to your Windows Start Menu, but will insist on running in single-tasking MS-DOS mode. This is required because when multitasking, it becomes difficult to properly back up or restore files that are in use by the operating system. Booting to DOS enables either program to create no image file of everything on a drive, including the long .TIF names and Windows Registry items, that are enormous not properly backed up by traditional backup utilities.

Both products are really simple. (In fact, Ghost ships on a single floppy diskette — when was the last time you bought a program that did that?) You can create an image file of everything on a computer's hard disk, and save it to some appropriate media. Then, run the utility's Restore function, creating a clone of the original machine on another one.

Both programs support cloning of multiple operating systems, including DOS, Windows 3.x, Windows 9x, NT, Unix, Linux, NetWare and OS/2, and can support restores across a variety of connection methods. Drive Image uses a Windows-like look and feel, even though, like Ghost, it is

Drive-Cloning Software Simplifies the Set-up Chore

by Alan Zimmerman

really operating under DOS. While Ghost doesn't try to clone the Windows 95 user interface, it offers both a usable graphical interface, and a quick and dirty command-line mode.

Both support re-partitioning the target machine "on the fly." If the target machine is not currently partitioned like the source, the products can re-partition as needed. And both are smart enough to not try to create a partition larger than the existing hard drive! Both are faster than traditional backup/restore software because they do not work file by file, but instead clone the total drive contents. In fact, creating a system from a drive image can reduce set-up time from several hours to around 6 minutes.

Each program has a way to work around a potential barrier to cloning: NT uses a System ID number, which needs to be unique on each machine on a network. Earlier versions of each program were unable to deal with this. The latest versions, however, provide workarounds. Ghost, for instance, includes a second diskette containing Ghost-Walker, an NT SID-Changing utility. Drive Image works with Microsoft's new NT System Preparation Tool to resolve this potential problem.

Ghost has a feature not currently supported by Drive Image that may make it the product to buy for local networks: It supports network multicasting — a single drive image can be sent at one time to multiple workstations over a TCP/IP network. The company reports that it can take as little as five minutes or so to replicate a 300MB image across a network of multiple machines. That's not going to help a VAR preparing computer systems one at a time, but could be a tremendous time saver in a corporate environment.

Drive Image Pro costs US\$6995 for a license that allows a single user to work on an unlimited number of computers. The company also offers the US\$699.95 Drive Image 2.0, with a license limited to a single user and a single computer. Both products are available at a variety of retail and software distribution sources, as well as directly from PowerQuest.

Ghost Professional 5.0 costs US\$795, plus \$3.50 to \$15 per seat, up to 10,000 seats.

Symantec has no plans to make it available via traditional retail channels — the company is distributing it in a plain brown box only.

Alan Zimmerman is a computer journalist and teacher living in Vancouver. He can be reached at azimmer@home.com.



Product: Drive 2.0
Vendor: PowerQuest Corp.
System Requirements: Pentium Processor, 16MB RAM, 1GB Hard Disk, CD-ROM
Price: \$699.95 per seat or \$699.95 for a license to 10,000 seats
Rating: 8

Product: Ghost 5.0
Vendor: Symantec Corp.
System Requirements: Pentium Processor, 16MB RAM, 1GB Hard Disk, CD-ROM
Price: \$795.00 per seat or \$3.50 to \$15 per seat, up to 10,000 seats
Rating: 8



C++ is Vital, says Expert Herbert Schildt

by Stephen Basulto

CCW: "Which areas would you recommend that programmers study — now and in the future?"

Schildt: To be a professional programmer today (and into the foreseeable future) requires knowledge of C++. Simply put, you cannot be at the top of your profession without being able to program in C++. C++ is still the universal language of programming. However, Java is also very important. Since it has many similarities to C++, if you know C++ you can easily move to Java. Other languages, such as Visual Basic may be important for specific jobs, but C++ and Java are the languages that every programmer should know.

The second part of the answer involves operating systems and component methodologies. Clearly, the ability to write Windows programs is a must for all programmers. This is the most widely used operating system on the planet. Beyond that, the ability to write COM (Component Object Model) modules and Java Beans is becoming increasingly important.

One other point: All C++ programmers should become familiar with the Standard Template Library. Its innovative container technology is changing the way many programs are written. Although its syntax is a bit intimidating at first, it is really quite easy to learn and use."

CCW: "As a member of the ANSI/ISO C++ Standards Committee, can you describe the latest changes and what's planned for the future?"

Schildt: "Several new elements were added to the language, including templates, namespaces, explicit instantiations, mutable members, the new casting operators, RTTI and the new-style header. Of course, the inclusion of the entire Standard Template Library was a major undertaking. Some of the later changes include partial template specialization and changes to the way that the new operator works."

There is one change that affects nearly every programmer. The entire C++ library (including the STL) was moved to the std

namespace. This means, for example, that you must now qualify library names with the std prefix. For example, std::cout. Alternatively, you can put the statement using namespaces std.

at the top of your program, which brings the std namespace into view. Moving the entire library into the std namespace was one of the most controversial changes that occurred during standardization.

One other change that many programmers are still not aware of: ANSI/ISO C++ does not define a header for the standard C++ header files. For example, many programmers still use <iostream.h>, but this is not defined by ANSI/ISO C++. Instead, the standard defines <iostream>. The important point is that the old .h headers are not even listed as deprecated features; they are simply not part of standard C++ at all. Of course, commercial compilers will continue to support the .h headers for a long time to come, so it is not necessary to re-code all existing programs immediately. But new programs should use the new-style headers."

CCW: "Where is the object-oriented paradigm leading, in the short and long-term?"

Schildt: "I see object-oriented programming remaining the dominant paradigm. Clearly, the ability of OOP to modularize functionality and manage complexity are tremendous benefits. In other words, OOP is here to stay. At the same time, I think we will see a small resurgence of interest in non-object oriented lan-

guages, such as C."

CCW: "What are your views on distributed component-based (COM and DCOM) programming and intranet/Internet Web-related applications?"

Schildt: "COM, DCOM and COM+ represent the future of programming for two reasons. The first is the fundamental need to simplify software development by organizing programs into smaller modules. Applications are becoming too complex, and software components offer a solution. The second is the rise of the networked environment, including local area networks and the Internet. Networks are important because they provide immediate, reliable access to downloadable components. Coupled with the new COM+ technology, these innovations will hopefully drive the wide-spread adoption of software components."

I can imagine a day (not too far away) when many applications are simply glued together from existing software components. The process will parallel the way IC chips are now used to create electronic circuits. It will even be possible for users to wire together their own simple programs. Of course, demand for component libraries will be quite large."

Stephen Basulto is a former researcher and technical coordinator at Capstone College, and can be reached at sbasulto@icbc.ca. The college and its faculty have ACE, CAPCE, CIPS, Migrating, Novell, IBM and Java certifications and accreditation.



the committee. The coverage is both intuitive, clear and concise. This book is a must for all serious C++ developers.
Rating: A+

Title: *C++ Complete Reference, Third Edition*

Author: Herbert Schildt

Publisher: Osborne McGraw-Hill, <http://www.osborne.com>

Cost: \$57.95

ISBN: 0-8407-3276-1

Description: A year ago, the ANSI/ISO committee released the International Standard for C++. This book has almost twice the content of second edition and clearly reflects Schildt's work on the

Empac

Empac, of Markham, Ont., is a Canadian IT solutions provider that wants to have all the bases covered, including distribution, system integration and OEM manufacturing.

Linking integration and distribution seemed an obvious approach to Empac founder and president, John Pang. "Since we were using a lot of brand-name equipment (as components) we might as well be their distributor too," Pang said. "We use a lot of brand-name peripherals and we buy a lot of brand-name hard drives, printers and video cards. So we became distributor."

Empac started as a systems integrator in 1991. By 1992, the company had branched out into the OEM private label monitor business and opened a second office, in Montreal.

Empac's suppliers are mainly from the United States and Asia. But the issue with it comes to suppliers is about finding a good fit, according to Pang. "We are very careful picking our suppliers. Some don't meet our requirements, so we simply don't sell their products. There has to be a fit."

Empac recently received ISO 9003 certification. "The certification recognizes the quality of our product and ensures the quality of our service."

Pang estimates Empac builds between 4,000 to 5,000 systems per month for sale through resellers. There are no direct sales to end-users. "Because we sell quite a lot of systems, we use different compatibility motherboards, hard drives, CD-ROMs, memory, CPUs, monitors and cases. We buy in volume, use a portion to build our own build-to-order (ETO) business and the rest is put into distribution. Because we buy in volume, we can negotiate a very good price with the manufacturers and pass the savings to our customers."

"This is a cut-throat business," he added. "We have to provide a combination of high volumes and products, and ensure our customers get the best price." Empac is one of two companies he deals with who do both integration and distribution, said Ross Snow, sales and marketing manager with Samsung Electronics Canada Inc. "They do a lot of handling of products, utilizing our products to integrate into their machines, as well as selling stand-alone products. So there's a really good fit."

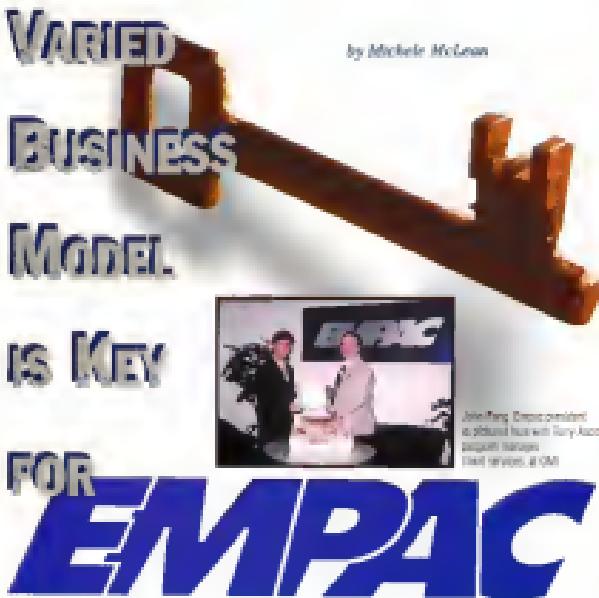
Snow said he believes Empac stands apart from other distributors. "Empac really goes after the integration market and the OEM type product market, and they do that very well," he said. "They've been doing it for a number of years."

Pang said most Empac clients order customized systems — configurations that are "moving targets." A typical workstation might be a 200MHz to 300MHz Pentium, with a 4.0GB hard drive, a 17-inch monitor, a 30X CD-ROM and a SoundBlaster sound card. He estimates Empac has 3,000 to 4,000 reseller partners in Canada. Through its Web site (<http://www.empac.ca>), Empac provides customers and partners with product and pricing information, technical support, plus patches and upgrades. "Our Web site includes the most current drivers for video cards and software," Pang said. "We constantly update them."

Like the fast-paced IT business itself, Empac, as a company continues to look for improvement, and ways of becoming a better all-round organization.

"Obviously there are a few things we're focusing on improving on a daily basis," Pang said. "One is sales and marketing strategies. Second is the management of the whole company. Third is our operations, procedures and inventory control. These are areas where our management team works constantly to improve."

by Michele McLean



John Pang, Empac president, is shown here with Tony Kao, program manager, Data Services, IBM.

FOR **EMPAC**

Pang broadened his company's business scope again in 1994 to also include hardware distribution. By 1995, Empac had opened a third office, in Vancouver. The company currently employs 150 people in its three full-service facilities. Pang claims his company can usually fulfill customer orders the same day. "We have no office, assembly line, service team and warehouse in Mississauga," Pang said. "Most companies only have a sales office or a 1-800 telephone line to a Toronto office. In that case, the reseller has to place an order, hoping the customer doesn't show up, log in order for a customer to get it the next day. But, with us, you order it in the morning and pick it up the same day."

Although Pang wouldn't disclose the annual revenues of his privately owned company, he admits his distribution branch is the highest growth area of the company. A recent addition that has proven very successful is the Creative Labs product line, he said.

Michele McLean is a journalist based in Toronto and a frequent contributor to Canadian Computer Week.

Stop Wasting Time!

How Can You Hijack These Peculiar Time-Wasters?



by
Douglas Gray

Like any other valuable resource, time can be managed. The better that's done, the more productive and profitable your business will be.

You probably don't have the time to attend to all the matters requiring your attention, so you must ensure that the important tasks get done. The most common time management steps are to set priorities, be organized, delegate and be decisive. Be certain to attend to the activities that generate continued profitability and future growth.

Too Many Telephone Calls

Ensure that written and verbal telephone messages are complete. Knowing not only the name and phone number of the person calling but also the purpose of the call lets you deal with the response quickly and effectively, often delegating the response to someone else. Branch your calls before lunch or towards the end of the day when people are less likely to chat.

Overscheduling/Too Many Things To Do

Concentrate on important items and disregard trivia. Use your diary to plan your day and prepare a priority list of tasks. Learn to say no. Delega-

Too Much Paper

Deal with each piece of paper only once. If it is junk mail, throw it out if it's to be filed, file it immediately. Or delegate routine matters to another staff member.

Unexpected Visitors

Keep the visit brief. Conduct stand-up meetings. Once someone is invited into a comfortably chair in your office with a coffee at hand, a good portion of your day could disappear. Arrange to meet the person for lunch or after work for an extended discussion.

Scheduled Meetings

Be certain they start and end on time, and follow the agenda. Keep on topic. Ensure that a summary is given, noting any actions to be taken after the meeting and by whom.

Errors

Draw conclusions from errors made, and avoid repetition. Perhaps retaining of personnel is necessary, or instructions need to be clarified. Have job procedures detailed in writing and included in your Procedures Manual for consistency and future reference. Ask the person in each position to draft the detailed job procedures for your later review.

Lack of Communication

State clearly what is expected when assigning work. If the work is submitted in an undefined manner, either than correcting it yourself (also known as "spread delegation"), return it in a useful manner with an explanation of the finishing reaction required. This will also help the employee's personal growth and understanding of the business. Encourage staff to ask questions if they are uncertain — remember dumb questions are easier to handle than dumb mistakes!

Perfectionism

Striving for excellence is healthy, gratifying and attainable. However, aiming for perfection is frustrating, narcissistic and a waste of time.

Fatigue

If you find that you are unable to work productively owing to fatigue, take time to relax and refresh yourself. Stretch, take a break from what you are doing, and take a short walk. During working hours, eat regularly, but sparingly and avoid alcohol.

Remember: time is money. And, while labor costs are high, so the owner-manager's time is the most valuable. By ensuring your time is well spent managing and planning for growth of the business, you model useful techniques for your staff. They will become more productive in the day-to-day running of your business. **WJ**

Douglas Gray, LL.B., has had extensive experience as a lawyer specializing in small business. He is currently a speaker, consultant and author of 16 best-selling books, including *The Complete Canadian Small Business Guide* (published by McGraw-Hill Ryerson) and *Start and Run a Profitable Business Using Your Computer: Start and Run a Profitable Consulting Business and Marketing Your Product* (all three published by Self-Counsel Press).

It's turning into war out there.

I'm not talking about operating systems, or Web browsers, or even Microsoft against everybody else. The real war is happening around sound cards.

Creative Labs' Sound Blaster (and relatives) have been ISA bus busters, along with modems, and were among the last of the peripherals to live on that legacy bus. The ISA bus is a dinosaur, sucking RAM and CPU resources, and standing in the way of easy and reliable plug-and-play.

It was just a matter of time before a new generation of sound devices left the ISA bus and the Sound Blaster heritage behind.

Now off the mark were a series of devices featuring a sound chipset from Auralic Inc. Available from a number of manufacturers, these all offer so-called A3D — Auralic's 3D sound offering. The idea is to move beyond stereo left-to-right panning, to offer more realistic sounds that seem to surround the user, moving forward and back as well.

3D sound is most desired by gamers, adding a new dimension to game playing with the "Look out! That's someone behind you!" feeling.

Auralic claims its models can implement 3D sound using only two speakers, for software written to take advantage of the A3D standard. The latest generation, A3D 2.0, works with Auralic's new Vortex3 AL3200 chip, a 3.3-million-transistor unit. While Auralic's first generation is found in lots of choices, the company is launching the new model in products from Diamond Multimedia Systems Inc. (the \$199 Monster Sound MU300) and Moycon Trade Beach Inc. Auralic claims the newest generation offers advanced raytracing to duplicate the 3D characteristics of a room, and enclosures — letting a sound from another room not just sound louder, but realistically modified.

Creative Labs is jumping feet-first into the fray, with a new generation of PCI-based products, also offering realistic 3D sound. The top of the line is the new Sound Blaster Live! card. It costs its exorbitant \$399. The \$299 card simultaneously meets the needs of game-players, multimedia developers, musicians, and audiophiles. Built around the EMU10K1 processor, the card features a

claim, 115 digitized signal-to-noise ratio, for sound quality that matches home stereo systems.

The EMU10K1 has more than four million transistors. (More transistors than in a Pentium CPU!) Using the processor's 1000 MIPS power, combined with the card's PCI design, the Sound Blaster Live! can carry out complex tasks without putting a load on the computer's main CPU.

Live! supports SurroundSound — actual sampled instrument sounds. Unlike earlier models, this no longer requires RAM on the card itself, as the card can be set

for on the card helps account for its exceptionally noise-free output. It does, however, support two pairs of speakers. Creative strongly suggests using four speakers (as well as a subwoofer) for the most realistic 3D, although the card can be used with a single pair of speakers.

In addition, this model comes with an additional set of outputs, of most interest to music and multimedia professionals. These outputs set up an additional slot and provide digital I/O. Included are a digital DIN jack for connecting a multi-channel amplifier like

Creative's SoundWorks! Desktop Theatre System (also owned by Creative Labs).

By Creative Labs), a SPDIF in and out ports for connecting a digital audio tape (DAT) machine, and real MIDI in and out ports, which are believed of professional musicians.

The bundled software reflects this professional focus. Along with the usual game, there are copies of Cadence Rhapsody Gold and Sonic Foundry's Sound Forge XP 4.0. A collection of Creative's sound utilities is also included.

Most users won't need the professional I/O hardware and software. Those users are best served by the Sound Blaster Live! Value Edition, which drops those features, but offers high-quality 3D sound for the same \$149 price quoted by Diamond's MU300.

The war between Auralic and Creative Labs provides a dramatic jump in sound quality, and gives vendors a way to differentiate higher-priced models from the base price. BT

Comments:

Auralic Inc. — <http://www.auralic.com>

Creative Labs Ltd. —
<http://www.creativelabs.com>

Diamond Multimedia Systems Inc. —
<http://www.diamond.com>

Moycon Trade Beach Inc. —
<http://www.moycon.com>

Alan Zimmerman is a computer journalist and teacher. Using his *Kontact* Web site he can be reached at alan@kontact.com.



to use THX or 32MB of system RAM for storing sets of SoundForge for more realistic MIDI playback.

Creative is countering Auralic's A3D programming standard with its own DAX Environmental Audio extension. DAX is an extension of Microsoft's DirectSound interface to allow programmers to produce realistic 3D effects. Unlike earlier Creative standards, DAX is being opened to other companies — ESS and QSound are currently on board.

The emerging consensus among game developers seems to be that A3D 2.0 is somewhat more refined, but a much more difficult development platform. Both Creative and Auralic are reportedly throwing around money to encourage developers to write games using their standards. Some games, like the cutting-edge *Unreal*, support both.

Sound Blaster Live! is a small PCI card, with the standard set of green/black port, line in, radio in, and speaker ports. Unlike older Sound Blasters, there's no support for multi-plated speakers — the lack of a small ampli-

NEW PRODUCTS

Look Ma, No Fax

Brother International Corp. (Canada) Ltd. seems to be propelling its MFC P2000 multi-function product for what it looks. In fact, the company claims to be offering "the first faxless multifunction centre."

The product includes laser printer, scanner and copier functionality. Brother suggests target users would include people who already have a modem in their PCs, as the scanner and print, or would allow them to deal with hard copies of faxes when necessary.

It prints documents at 600 by 600 dpi resolution in a speed of 18 pages per minute. And documents are scanned at 600 by 600 interpolated resolution.

The suggested retail price is \$899. See <http://www.brother.ca/products/faxless.html>.

That's Really Reaching



Somerset, NJ-based Comstar Computer Inc. has announced its Cat5 Reach transmitter and receiver pair designed to extend the range of isolating and maintaining long-distance keyboard, mouse and mouse servers to Sun/Windows PCs, Macs and Beos or to multiple computers connected to Raritan KVM switch products.

Repeater, video and mouse signals can be transmitted over a single standard Category 5 UTP cable up to a distance of 600 feet, using this product. The Cat5 Reach transmitter and isolated keyboard, monitor and mouse for a local workstation.

Bill Pollock, vice president of Perkin Computer Inc., said in a statement, "Cat5 Reach solves a whole new dimension for Macintosh and Compaq/DEC customers. Now they can connect computers and user stations to their workstations at much greater distances, providing more convenient access at greatly reduced costs. Also, by connecting Macintosh users, administrators and managers can have central control over clusters of 256 servers over a thousand feet apart."

Cat5 Reach is priced at US\$949. E-mail: comstar@perkin.com.

If It Weren't Red Enough...

If your customers aren't buying the Year 2000 top of mind, maybe a funny reminder will do the trick?

According to Green Advertising Inc., of Englewood, Minn., the plush Millennium Bug will "raise your awareness of the Y2K problem." Sporting wings decorated with concentric arrows, the bugs' wings include an area available for personalized messages.

Suggested retail price is US\$29.95.



Notebook Targets High-end Consumers

Ahead of what the company says is a "consumer" market, Compaq Canada Inc. has launched the Presario 1100aptops PC, including an integral DVD drive. It's based on a Pentium II 300MHz processor with 64MB RAM, a 8-GB hard drive, a large color screen, a 56K modem and a USB connector. Suggested list price is \$1,100.

The introduction of a high end consumer/SOHO oriented notebook such as the Presario 1100 is a sign that Compaq is targeting for leadership of an emerging premium consumer notebook market, a space in which Hewlett-Packard, Duracell, Sony and Dell are also aiming.

See <http://www.compaq.ca>.

One LCD, you...

Okidata is shipping the DR300LSE 16-in. portable/flat panel at less than \$20,000.

With 1440x960 memory standard (expandable to 1600x1200), the product boasts 800 dpi printing and 14,000 page-per-month-duty cycle. It accepts all PC, Mac, including 44 line Type fonts, PC-Sc and Adobe Postscript 3 emulations.

The printer comes standard with a 500 sheet letter-size universal tray. A power-saving mode reduces power consumption to less than 20 watts at idle mode.

Okidata is a big proponent of light emitting diode (LED) technology as an alternative to laser printing. "It's capable of extremely high quality of print speed," said Ian Campbell, general manager of Okidata operations.

With just 26 employees in the country, Campbell said the private company is well positioned across Canada. For more information on Okidata products, see <http://www.okidata.com>.



Bank On-line with QuickBooks

Gilberton-based Intuit Canada has announced QuickBooks and QuickBooks Pro for Windows, the latest versions of its financial management software for small business. Targeted for an on-line banking in a key feature.

QuickBooks now incorporates the Open Financial Exchange (OFX) banking standard, as well as multiple users. According to Intuit, these features were the most requested addition among QuickBooks users. Bruce Johnson, general manager of Intuit Canada says, "QuickBooks is designed for low budget and provides access to Web resources because more than 100 per cent of Canadian users use the Internet for business purposes."

QuickBooks 6.0 is priced at \$749.95 and QuickBooks Pro is \$949.95. See <http://www.intuit.com/canada/quickbooks>.

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PeopleSoft Announces Outlines Vice-President

PeopleSoft Canada has appointed Michael Lefebvre to the position of vice-president, Quebec, where she will manage corporate activities in the Quebec market.

Lefebvre joined PeopleSoft from IBM, most recently as director of system 2000 services.

She previously worked for a developer in the city of Ste. Foy-Les-Sainte-Foy, and a former board member of several business, cultural, education and sports organizations.



Michael Lefebvre

Bill Jones, vice-president of sales for Mental Canada Inc., has been elected into the Special Olympics Hall of Fame. He is one of 50 people to have that honor since 1989.

He was recognized for his commitment to Special Olympics in Ontario, an organization that provides sports programs for mentally disabled Canadians.

For the past 18 years, Jones has been on the board of directors for the Sports Disabilities Festival for Special Olympics, and has received corporate sponsorships, most recently from CompuCom Canada.

Mental Canada donates about \$50,000 worth of computer products and services annually, the company says.

Executive Will Head NCR Customer Services

Dayton, Ohio-based NCR Corp. says William Eisenhart, senior vice-president for the company's national accounts software group, will now lead the worldwide customer services group. That group incorporates 15,000 customer service professionals in 100 countries. Meanwhile, Mark Head will take over Eisenhart's previous job, and has been promoted to senior vice-president.

Calendar

Jan. 18
Celebrating on What You Know:
Innovation Is Sustainable
Great Woods
Toronto
<http://www.greatwoods.com>

Jan. 20
"Transform Yourself and Open Up an Opportunity?"
MAT Special Interest Group
Toronto
800-263-1121

Jan. 20
The Wind Down: Looking ahead meeting
Toronto
<http://www.winddown.ca>

Jan. 22
Association of Internet Marketing and Sales
(AIMS) monthly meeting
Toronto
<http://www.aimsociety.com>

Tektronix Canada Names Marketing Manager

Guelph, Ont.-based Tektronix Canada Inc. has named Caroline McGrath as marketing manager for the color printing and imaging division.

She has responsibility for developing and implementing "go-to-market" programs.

McGrath was previously marketing communications manager at Epson Canada Inc.

**Do you have an upcoming event
you'd like to see listed in CDM's
Calendar? E-mail: cdir@top.ca.**

Jan. 18
Celebrating on What You Know:
Innovation Is Sustainable
Great Woods
Toronto
<http://www.greatwoods.com>

Jan. 20
"Transform Yourself and Open Up an Opportunity?"
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(AIMS) monthly meeting
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<http://www.aimsociety.com>

Reader Poll

Our Questions to You:

For years now, pundits have said we're on the verge of taking color printing to new heights of business printing. What printing technology has the best chance of making that finally happen?

Which Color Clearly Reflects Your View?

- Color jet printers will be the most significant opportunity for growth in business printing.
- Color lasers will be the most significant opportunity for growth in business printing.
- Other technologies, such as LED (with potential for higher speeds), will bring opportunities for growth in business color printing.
- The business market for color won't grow substantially in 1999.

Last Issues, No Averages:

As a channel player how did your own company's 1998 financial performance compare with the previous year?

You Said:

25% Our financial problems didn't last as in 1997.

12% There has been substantial improvement.

44% There's been some improvement.

12% Our financial situation is somewhat worse.

2% Our financial situation is substantially worse.

We Asked:

Overall, do Canadian companies in general, which most closely matches your own, believe the financial situation in 1998 to 1997?

You Said:

15% The financial health of the industry in 1998 was similar to 1997.

18% There was approximately financial improvement in 1998 over 1997.

33% There was some financial improvement in 1998 over 1997.

31% The industry was considerably less financially healthy in 1998 compared to 1997.

7% The industry was considerably less financially healthy in 1998 compared to 1997.

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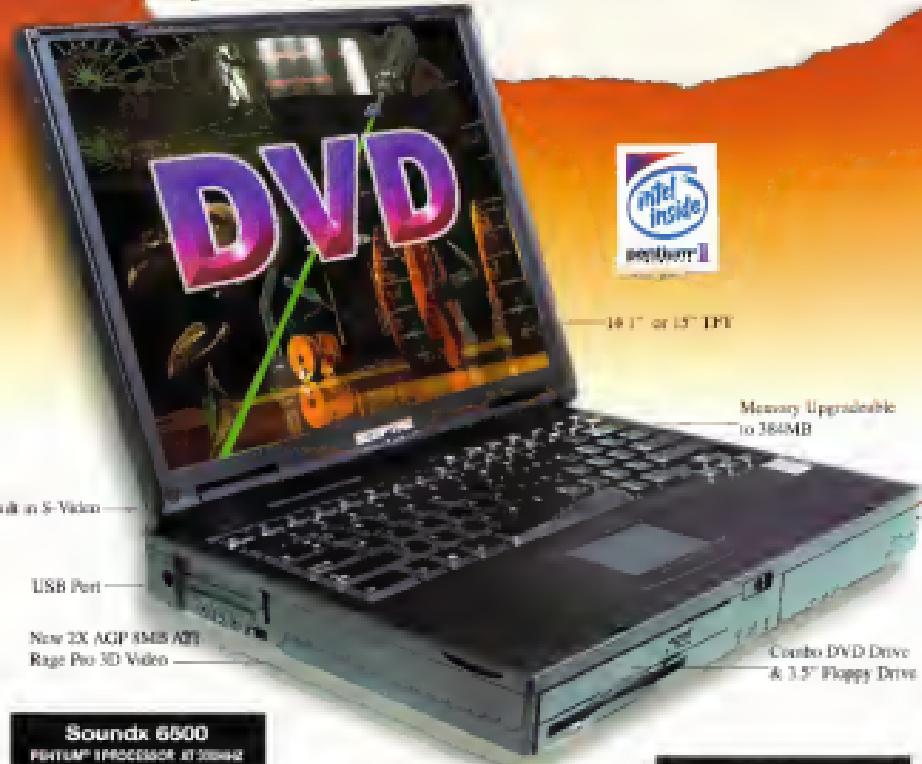


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